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INSULIN DEFICIENCY AND INSULIN INEFFICIENCY*

BY

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The work I wish to present to you had its origin in a chance observation by Claude Bernard (1877) He noticed that when starving dogs were allowed to satisfy their hunger with carbohydrate food sugar appeared in their urine. This phenomenon was amply confirmed by subsequent workers, but little further progress was made towards understanding its significance until the invention of reliable methods for estimating the blood sugar enabled Bang (1913) to demonstrate that starvation impaired the blood glucose-tolerance curve. Ten years later Adlersberg and Porges (1926, 1929) in Vienna and Sweeney (1927) in America, and soon many other workers, showed that diets rich in fat were associated with a similar impairment of the glucose-tolerance curve and, further, that diets rich in carbohydrates resulted in an improvement of the tolerance curve. This sudden renewal of interest in the effect of diet upon sugar tolerance was directly attributable to a revolution that had occurred in the therapeutics of diabetes mellitus.

Influence of Carbohydrates on Insulin Sensitivity

The discovery of insulin, although it altered the whole prognosis for diabetic patients, was not a revolution in that it required a change in our ideas regarding the disease. The existence of insulin had been accurately foreseen, and when it became available its effects on diabetes mellitus were in accordance with our expectations. But shortly after the use of insulin became general a revolution in the true sense of the word occurred. Up to this time it had been assumed that increasing the amount of carbohydrate in the diabetic's diet would necessitate a corresponding increase in the dose of insulin required. When, however, this supposition was put to the test, to everybody's surprise it was found that in many diabetics this dietetic change necessitated no increase in their insulin requirements and in some cases actually led to a decrease. Such a paradox naturally attracted considerable interest, and in the effort to find its explanation attention became redirected to the effect of dietetic change upon the sugar tolerance of healthy people.

In Fig. 1 is shown the effect upon the blood glucose-tolerance curve of a healthy person of changing the diet from one poor in carbohydrates and rich in fat to one rich in carbohydrate and poor in fat. It will be seen that on the former diet the blood-sugar curve is high and prolonged, indicating impaired carbohydrate tolerance, while on the latter diet it is low and short, indicating improved

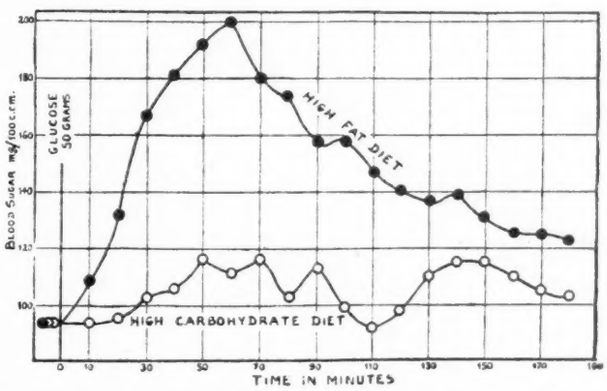

FIG. 1.—Two blood glucose-tolerance curves from the same normal subject—one when taking a low carbohydrate–high fat diet and the other when taking an equicaloric high carbohydrate–low fat diet. On the former diet the glucose tolerance is impaired, on the latter it is improved (Himsworth, 1934b).

tolerance. The first question which arises is, to what dietary change can the alteration in glucose tolerance be attributed? By testing suitable series of diets the responsible factor was disclosed. Neither the caloric value nor the fat content nor the protein content of the diet has any influence. The sole dietetic factor influencing glucose tolerance in healthy people is the absolute amount of carbohydrate in the diet. Increase of dietary carbohydrate improves the glucose tolerance, decrease of carbohydrate impairs it (Himsworth, 1935).

Now you will remember that the most striking feature of the therapeutic paradox was that increasing the carbohydrate content of the diet of diabetics did not necessitate a proportionate increase in the insulin requirements. A possible explanation of this observation is that the composition of the diet influences not only the sugar tolerance but also the efficiency with which insulin acted. Accordingly the effect of dietary changes upon the speed and degree with which a standard intravenous dose of insulin depressed the blood-sugar level in healthy subjects

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was investigated. It was found at once that subjects taking a high carbohydrate–low fat diet were much more sensitive to insulin than were subjects taking a low carbohydrate–high fat diet (Fig. 2). The subjects were then given the same series of test diets used in determining which dietary

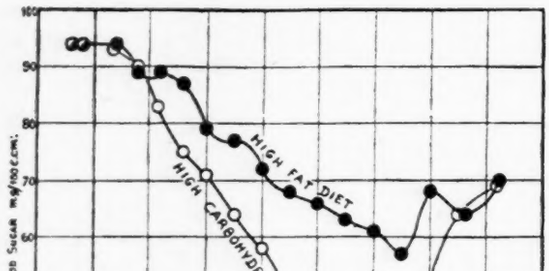

FIG. 2.—Two insulin-depression curves from the same normal subject—one when taking a low carbohydrate–high fat diet and the other when taking an equicaloric high carbohydrate–low fat diet. On the first diet the insulin injected intravenously comes into action more slowly and to less extent than when the subject takes the second diet (Himsworth, 1934b).

constituent was responsible for the change of glucose tolerance, and it was similarly found that the sole dietetic factor influencing insulin sensitivity is the absolute amount of carbohydrate in the diet (Himsworth, 1935). This result clearly has a direct bearing on the observation that in certain diabetics increase of dietary carbohydrate requires no increase in the insulin dosage. But it has a further significance. It shows that the efficiency with which each unit of insulin acts in the body is not fixed, but is dependent upon the factor of sensitivity of the body to insulin. Realization of this point revealed the possibility that a type of diabetes mellitus might exist which was due not to lack of insulin but to insensitivity to insulin. The state of knowledge at this stage of the investigations was not unfavourable to such a conception, for it was then well established that in many fatal cases of diabetes mellitus the islets of Langerhans in the pancreas were apparently unscathed by the disease.

At first sight it would appear easy to put this possibility to the test by simply comparing the speed and degree to which a standard dose of insulin depressed the fasting blood-sugar level in different diabetic patients. This line of approach is, however, impracticable. The effect of insulin varies with the height of the blood-sugar level, so that the higher the blood-sugar level the greater the effect of insulin. In different diabetics the blood-sugar level varies widely and thus renders incomparable the effects observed after intravenous insulin in different patients.

The Insulin–Glucose Test

A new test was therefore devised. This was based on the observation previously made on animals that the effect of insulin in suppressing the rise of blood sugar following the injection of glucose was proportional to the animal's sensitivity to insulin (Himsworth, 1934a). The technique of the insulin–glucose test is as follows: Three samples of blood for estimation of the blood sugar are taken from the fasting patient. Insulin, 5 units per square metre of body surface, is then injected intravenously, and the patient immediately drinks a solution of glucose containing 30 grammes of glucose for every square metre of his body surface. Further samples of blood for analysis are then taken at frequent intervals. On applying this test to diabetics it was immediately apparent that two different types of response are obtained (Himsworth, 1936). In one the injected insulin comes into action rapidly and suppresses the immediate rise of blood sugar which should follow the ingestion of the glucose. This type of response we have called the insulin-sensitive. In the other the injected insulin comes into action only slowly and fails to suppress the rising blood sugar. This type of response we have called the insulin-insensitive. The question which now arises is whether these two types of response correspond to two distinct types of disease each of which manifests itself as the syndrome of diabetes mellitus. On applying the insulin–glucose test to diabetic patients Kerr and I found that all the responses obtained were of one or other type (Himsworth and Kerr, 1939b). We saw no group of patients who gave responses of an intermediate type, and therefore we concluded that the insulin–glucose test differentiated two distinct types of diabetes. In support of this view we found that the two types of case reacted differently to changes in diet. When the amount of carbohydrate in the diet of the sensitive diabetic was increased while the insulin remained unchanged no increase of glycosuria occurred, the fasting blood-sugar values did not rise, and the blood sugar-tolerance curve either improved or remained unaltered. On the other hand, the insensitive type of diabetic reacted to increase of dietary carbohydrate by an increase of glycosuria, and a tendency to elevation of the fasting blood-sugar level and to impairment of the glucose-tolerance curve (Himsworth and Kerr, 1939b). Corresponding to the cases giving one or other of the two types of response to the test two clinical groups of patients can be distinguished, and these two groups bear a remarkable similarity to the two clinical types of diabetic patients distinguished by Falta (1936). The clinical distinction is not, however, precise, as cases which clinically are of the type usually giving an insulin-sensitive response may be found on testing to give an insensitive response, and vice versa. On the whole the insulin-sensitive diabetics tend to be younger, to be thin, and to have a normal blood pressure and healthy arteries. In them the disease is sudden and severe at onset; they easily develop ketosis and react to a slight excess of insulin with a hypoglycaemic attack. The insensitive diabetics, on the other hand, tend to be older, obese, and to have hypertension and arteriosclerosis. In them the onset of the disease is insidious; they rarely develop ketosis and can tolerate overdosage of insulin without showing symptoms of hypoglycaemia (Himsworth and Kerr, 1939b).

Taken together this evidence strongly suggests that two distinct types of diabetes exist, but sure proof that the two different responses to the insulin–glucose test distinguish two different disease processes can only be given by the demonstration of two different pathological mechanisms each giving rise to diabetes mellitus.

Implications of the Two Types of Response

Inspection of the two types of insulin–glucose curve gives a hint of the essential nature of the difference underlying the response. This is more easily seen when the glucose-tolerance and the insulin–glucose curves from a healthy subject, a sensitive diabetic, and an insensitive diabetic are compared (Fig. 3). The insulin–glucose response of the sensitive diabetic is essentially normal, the insulin injected having changed the abnormal glucose-tolerance curve which follows glucose alone to a normal insulin-glucose curve. Thus the abnormality in the sensitive

diabetic is corrected by insulin, suggesting that the disease in the sensitive diabetic is due to the lack of insulin. In the insensitive diabetic, however, the injected insulin has not this effect, and the insulin–glucose curve remains as abnormal as the tolerance curve after glucose alone. This suggests that the disease in the insensitive diabetic is due not to lack of insulin but to inefficient insulin action.

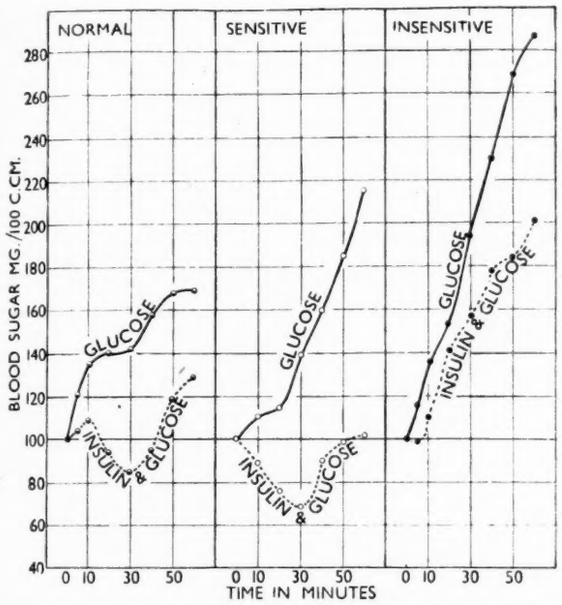

FIG. 3.—Glucose-tolerance and insulin–glucose curves from a normal subject, from an insulin-sensitive diabetic, and from an insulin-insensitive diabetic. The composition of the diet was approximately the same in each case (Himsworth and Kerr, 1939b).

Now, perhaps the most characteristic action of insulin is its ability to increase the rate in which the peripheral tissues remove sugar from the blood. In man a rough idea of the extent to which the peripheral tissues are abstracting the sugar can be obtained by comparing the glucose content of the capillary blood with that of the venous blood leaving a limb. As the capillary blood sugar rises after ingestion of glucose the capillary–venous blood-sugar difference increases, and this increase is attributed to the pancreatic insulin secreted in response to the rise of blood sugar. If the experiment is repeated, but the insulin is injected intravenously at the same time as the glucose is taken by mouth, it will be found that the injected insulin has caused an enormous increase in the capillary–venous difference.

On performing these two experiments on each of the two types of diabetic a striking difference is revealed (Himsworth, 1936). In the sensitive diabetic insulin causes the normal increase in the capillary–venous difference, but in the insensitive diabetic it has little effect. In the sensitive diabetic the action of insulin in accelerating the rate at which the peripheral tissues remove sugar from the blood is normal; in the insensitive diabetic it is impaired. It appears, therefore, that in the insensitive diabetic, even if the normal amount of insulin were available from the pancreas, the insensitivity of the peripheral tissues to insulin is such that the secreted insulin would be unable to promote the removal of sugar from the blood at normal rates, and thus diabetes mellitus would result. From a study of the changes of the glucose-tolerance and insulin–glucose curves in normal subjects when sensitivity to insulin is varied by means of dietary change it can be deduced what would be the nature of the insulin–glucose response in diabetes due on the one hand to lack of insulin and on the other to insensitivity to insulin. These theoretical deductions accord with the observed measurements of the insulin–glucose test in the two types of diabetic patients (Himsworth and Kerr, 1939b).

Up to this point we have been considering only the first hour of the insulin–glucose curve—that is, we have been concerned more with the rate at which the injected insulin came into action than with the total effect of the insulin in suppressing the alimentary hyperglycaemia. On examining the insulin–glucose curves over longer periods, however, it will be seen that the total effect of insulin in suppressing alimentary hyperglycaemia tends to approximate in the two types of case. This observation suggests that insensitivity to insulin results from a retardation of insulin action rather than from a neutralization or a destruction of insulin. It appears, therefore, that the sensitive type of diabetes can be explained on the grounds of insulin deficiency, while the insensitive type of diabetes must be explained by inefficiency of insulin due to a retardation of insulin action in the peripheral tissues (Himsworth and Kerr, 1939b). At the time when the conception first emerged there was no known substance which would thus inhibit the peripheral action of insulin; but one has since been found in the anterior pituitary gland.

Pituitary Gland and Diabetes Mellitus

The association between disease of the pituitary gland and abnormal carbohydrate metabolism has been known since Pierre Marie recorded the frequent occurrence of glycosuria in acromegalics. Later the recognition by Cushing of the frequency of glycosuria in cases of pituitary basophilism has strengthened the clinical evidence for this association. Within the last few years the connexion has been established through the brilliant work initiated by Houssay (1937). He showed that removal of the pituitary gland ameliorated the diabetes of depancreatized dogs and that injection of extracts of the anterior pituitary gland into normal animals would temporarily produce a diabetic state. Pituitary extracts contain a factor which inhibits insulin action in the intact animal, and it has now been shown that this inhibition takes place largely, if not entirely, in the peripheral tissues (Marks, 1936; Himsworth and Scott, 1938b). This anti-insulin factor therefore has the property required to produce the state of insensitivity to insulin characteristic of one type of diabetic patient, and it was found that after injection of such an extract into a normal animal the previously normal sensitive insulin–glucose curve was changed to an abnormal insulin-insensitive type (Fig. 4).

At this stage the important work of F. G. Young can be considered. He has shown that after a course of injections of crude anterior pituitary extract dogs become permanently diabetic (Young, 1937). It might have been expected that the permanent diabetes in these animals would prove to be of the insensitive type, but it has now been shown that the disease is of the sensitive type (Young, 1939), associated with gross changes in the islets of Langerhans and grave deficiency of insulin.

Evidence both experimental and clinical is available that a substance identical with or similar to the anti-insulin factor can be secreted by the anterior pituitary gland. If the pituitary gland is removed from the normal animal then the usual changes in insulin sensitivity which follow variations in dietary carbohydrate do not occur, but in such an animal these changes can be mimicked by injecting the appropriate amounts of the pituitary extracts

(Himsworth and Scott, 1938a). The inference is that the substance responsible for insulin insensitivity is secreted by the pituitary gland. Clinically the evidence is provided by studies on the diabetes of cases of Cushing's syndrome and acromegaly. The diabetes associated with these two types of hyperpituitarism has been found to be of the insensitive type. It has been shown in such cases that

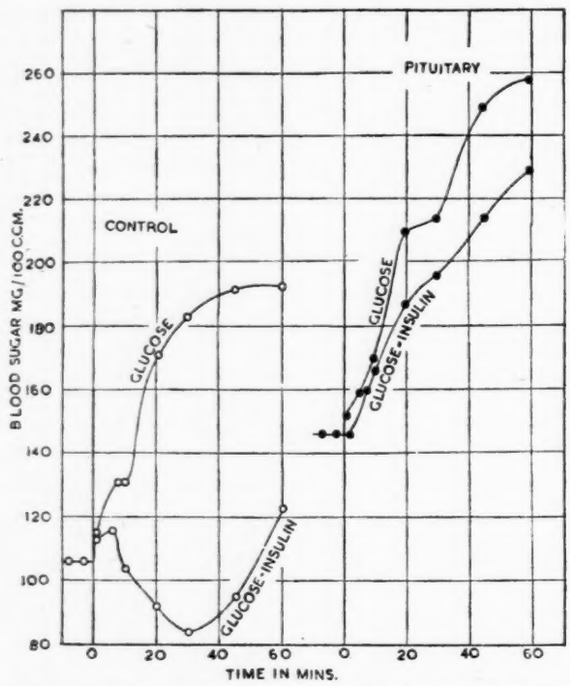

FIG. 4.—Glucose-tolerance and insulin–glucose curves from the same rabbit, before and after it had received injections of a crude extract of the anterior pituitary gland. In the untreated animal the fasting blood-sugar level is normal, the glucose-tolerance curve is normal, and the insulin–glucose curve is of the sensitive type. After the injection of the pituitary extract the fasting blood-sugar level is raised, the glucose-tolerance curve is at a high level, and the response to the insulin–glucose test is of the insensitive type.

irradiation of the pituitary region with *x* rays ameliorates the clinical severity of the diabetes and at the same time improves the sensitivity to insulin as measured by the insulin–glucose test (Himsworth and Kerr, 1939b).

In view of these facts it appeared profitable to attempt the detection of the anti-insulin type of pituitary factor in the body fluids of diabetics. No trace of any such substance was found in the blood of any case of diabetes mellitus. Neither was any trace found in the urine of sensitive or ordinary insensitive diabetics; but definite amounts were present in the urines of a case of acromegaly and two cases of Cushing's syndrome, and, further, the amount of anti-insulin substance excreted diminished with irradiation of the pituitary region (Himsworth and Kerr, in press).

Conclusion

It is convenient here to summarize the present position of our knowledge regarding human diabetes mellitus. There is considerable evidence that two types of diabetes can be differentiated on the basis of the speed with which they react to insulin. In one type, the insulin-sensitive type, insulin comes into action rapidly; in the other, the insulin-insensitive type, insulin comes into action slowly. The evidence is compatible with the suggestion that the disease in the sensitive type of case is due to deficiency of insulin, while in the insensitive type the disease is due not to lack of insulin but to impairment of insulin action. At present, although there is evidence that the anterior pituitary gland may be responsible for the diabetes associated with hyperpituitarism, the indictment of the pituitary gland as a primary factor in ordinary cases of human diabetes mellitus rests purely on analogy (Himsworth, 1939).

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STRAIN VARIATIONS IN THE RESISTANCE OF STREPTOCOCCUS VIRIDANS TO SULPHONAMIDE COMPOUNDS

BY

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The introduction of the sulphonamide group of drugs has once more brought into being hopes of a successful treatment of subacute bacterial endocarditis, and a number of papers on the application of these drugs to the disease have been published. Whitby (1938) reported two cases which were influenced by the use of sulphapyridine, and Ellis (1938) records one similar case and another influenced by sulphanilamide. Spink and Crago (1939) treated twelve fully authenticated cases of the disease, and in six of these sterility of the blood was attained, in four there was abatement of fever, and one case was apparently cured. Another case of apparent recovery is described by Andrews (1940).

Cases of Subacute Bacterial Endocarditis treated with Sulphonamides

A prominent feature of the treatment of subacute bacterial endocarditis is that some cases appear to be influenced by the drugs while others pursue their course quite unaffected by them. It seemed that the infecting organisms, though in each case a *Streptococcus viridans*, might differ in their susceptibility to sulphonamide derivatives. With this possibility in view four strains of *Strep. viridans* isolated by blood culture from patients suffering from subacute bacterial endocarditis were tested for their susceptibility to the bacteriostatic action of three drugs—4:4'-diaminodiphenyl sulphone, sulphapyridine, and the soluble sodium salt of sulphapyridine—their effects being compared with those produced by the drugs in the patient from whom the streptococcus was derived. The following are particulars of the four cases:

Case 1.—A bank clerk aged 32 had a five-months history beginning with a typical attack of acute rheumatism. A temporary improvement occurred, only to be followed by a

severe attack of haematuria accompanied by fever, which persisted, and the occurrence of fleeting pains in the shoulders and chest and of Osler's nodes. On admission to hospital the signs of mitral stenosis were present and the spleen was easily palpable. Blood cultures on two occasions yielded

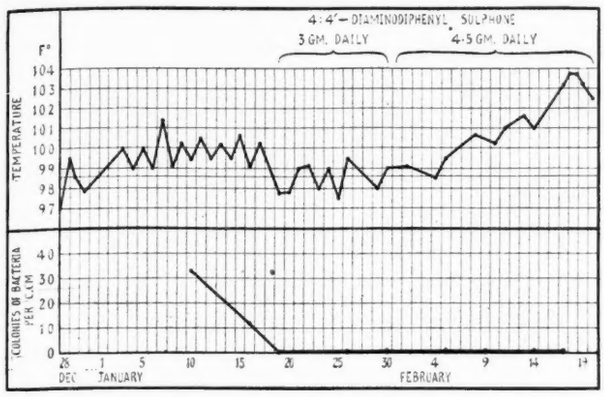

FIG. 1.—Temperature chart and bacterial counts in Case 1.

33 and 12 colonies of a *Strep. viridans* per c.cm. of blood. Treatment was begun with 4 : 4′-diaminodiphenyl sulphone, 1 gramme three times a day. A temporary decrease in the temperature occurred, though after two weeks of continuous treatment it gradually mounted again. The blood culture, however, became sterile and remained sterile on six subsequent occasions. Increased dosage of the drug produced no clinical improvement (Fig. 1). The patient died suddenly after thirty-three days of treatment, during which no positive blood cultures were obtained. At necropsy the heart showed severe healed rheumatic endocarditis of the mitral valve, in one area of which was a very small malignant vegetation at a site where one of the chordae tendineae had ruptured. Infarction of the spleen and focal embolic nephritis were also present. Histologically, serial sections of the mitral valve showed small areas of ulceration on the valve surface. In sections stained with haematoxylin and eosin no organisms could be seen, but in those stained by Gram's method many cocci were observed deep to the fibrin.

Case 2.—A nurse aged 39 had a six-weeks history of lassitude and fever. On admission to hospital she was febrile and a few petechiae were seen. Signs of aortic regurgitation were present in the heart. The spleen was not palpable. Blood cultures on two occasions yielded 34 and 39 colonies of a *Strep. viridans* per c.cm. of blood. Treatment was begun with 4:4′-diaminodiphenyl sulphone, 0.5 gramme four times a day, and continued for six days, when it was stopped on account of severe toxic symptoms. Sulphapyridine was then tried for two weeks, and again treatment was stopped on the occurrence of less profound toxic symptoms. Finally sulphanilamide was given for three weeks. Throughout treatment no decrease in the fever or clinical improvement was obtained, and the blood cultures remained consistently positive, with counts fluctuating from 92 to 29 colonies per c.cm. At necropsy large fleshy vegetations were found affecting a bicuspid aortic valve only. Splenic infarction and focal embolic nephritis were also present. Histologically, sections of the aortic valve showed innumerable cocci beneath the fibrin covering of large areas of ulceration.

Case 3.—A nurse aged 40 had a four-months history of the insidious onset of lassitude and fever, followed by the occurrence of petechiae and Osler's nodes. On admission to hospital she was febrile, and recent and fading petechiae were seen. The signs of mitral stenosis were present. The spleen was not palpable. Blood cultures yielded 208 colonies of a *Strep. viridans* per c.cm. of blood. Treatment with 4 : 4′-diaminodiphenyl sulphone, 0.5 gramme three times a day, was given for fifteen days. During the last ten days of this treatment the patient became afebrile and three successive blood cultures were sterile. Signs of toxicity appeared and the treatment was stopped, being started again with a smaller dosage. The blood culture became positive, and persisted so throughout the course of the disease. It was found that dosage of the sulphone above 1.5 grammes a day was accompanied by intolerance and that the fever continued unabated despite the treatment. The bacterial content of the blood varied between 20 and 40 colonies per c.cm. An attempt to raise the concentration of the sulphone in the blood by a continuous intravenous infusion of saline solution of it was made, and 16 grammes were given in sixty hours. A significant rise in the bacterial count from 18 to 107 colonies per c.cm. occurred immediately and there was no clinical improvement. Later treatment with sulphapyridine was also of no avail. Two weeks later the patient died as a result of a cerebral embolism (Fig. 2). At necropsy the heart was enlarged and the musculature was somewhat fibrotic. The mitral valve showed much thickening and shortening of its chordae tendineae, and there were many small friable vegetations confined to the cusps. Infarction of the lungs, spleen, kidneys, and brain was present. Histologically the valve cusps showed an ulcerated surface covered with fibrin, beneath which were innumerable cocci.

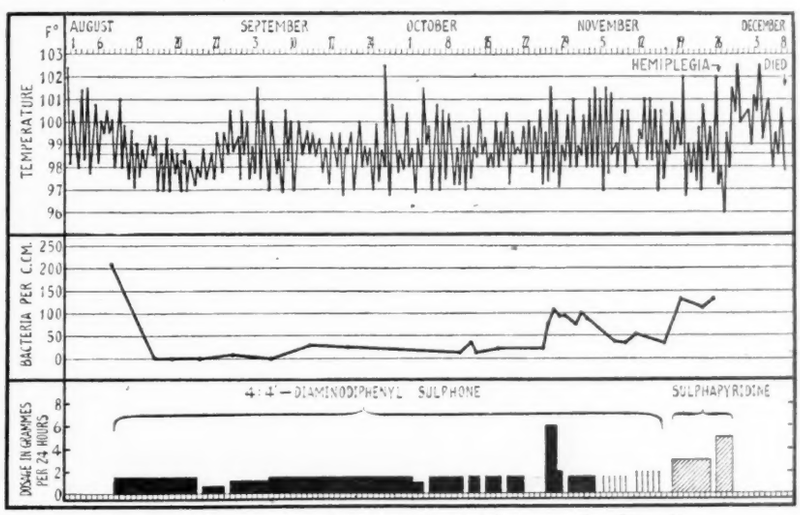

FIG. 2.—Temperature chart and bacterial counts in Case 3.

Case 4.—A garage proprietor aged 38 had a four-months history of fever and pains in the neck and shoulders followed by the occurrence of Osler's nodes. On admission he was febrile and a few petechiae were seen. There was marked pyorrhoea, and the signs of mitral and aortic regurgitation were also present. The spleen was not palpable. Blood cultures yielded a growth of *Strep. viridans*. Treatment was given with 4 : 4′-diaminodiphenyl sulphone, 0.5 gramme three times a day, for nineteen days. No clinical improvement or lowering of the temperature followed, and the bacterial count varied from 52 to 59 colonies per c.cm. of blood. Treatment with sulphanilamide, 2 grammes four times a day and later reduced to 1 gramme three times a day, was tried for ten days with similar results. Slight symptomatic improvement was obtained with two immuno-blood transfusions; but throughout the illness the pyrexia continued, and the bacterial count varied between 59 and 74 colonies per c.cm. The patient returned to his home and died two weeks later. No necropsy was made.

Bacteriological Technique and Findings

In these four cases frequent blood cultures were necessary and the following technique was adopted. Four glucose-broth tubes were inoculated with varying amounts

of citrated, or liquid containing, blood, and simultaneously three shake cultures, two with 1 c.cm. and one with 0.5 c.cm. of the blood, were made in melted legumin agar at 46° C. The broth cultures were incubated for at least fourteen days before a report of sterility was made. The three shake cultures were incubated, usually for forty-eight hours, and the average of the three plate counts was reported as the bacterial content of the blood.

The four strains of *Strep. viridans* obtained by blood culture from the cases described were tested *in vitro* against 4:4'-diaminodiphenyl sulphone, sulphapyridine, and the soluble sodium salt of sulphapyridine. The medium used throughout was a pancreatin digest broth of horseflesh adjusted to a *p*H of 8 as recommended by Okell. In this medium *Strep. viridans* produces a heavy flocculent growth, whereas in Wright's broth the growth is often scanty. Dilutions of each drug were made in the broth so that the resultant concentrations fell from 1 in 2,000 to 1 in 256,000. The technique was similar to that used by Francis (1938) in his work on susceptibility of *Brucella abortus* to sulphanilamide. To six series of dilutions were added known numbers of living organisms varying in amount from approximately 1,000,000 to 10. The actual size of each inoculum was determined by making shake cultures of the three final dilutions of the eighteen-hour-old broth culture of the streptococcus used for the experiment. The results of these tests are seen in Tables I and II.

An investigation into the fermentation reactions of each strain was made. The strains differed widely from each other, and marked morphological and colonial variations were observed. There appeared to be no relation between

TABLE I.—*Growth of Strep. viridans Strains isolated from Cases 1 to 4 in Broth containing Varying Amounts of Sulphapyridine*

Source of Organism	No. of Living Cocci in Inoculum	Dilution of Sulphapyridine in Broth								Control with no Drug
		1/2,000	1/4,000	1/8,000	1/16,000	1/32,000	1/64,000	1/128,000	1/256,000	
Case 1 ..	200,000	0	0	0	+	+	+	+ +	+ +	+ + +
	20,000	0	0	0	0	0	0	+ +	+ +	+ + +
	2,000	0	0	0	0	0	0	0	0	+ + +
	200	0	0	0	0	0	0	0	0	+ + +
	20	0	0	0	0	0	0	0	0	+ + +
	2	0	0	0	0	0	0	0	0	+ + +
Case 2 ..	1,400,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	140,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	14,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	1,400	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	140	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	14	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
Case 3 ..	700,000	+	+ +	+ +	+ +	+ + +	+ + +	+ + +	+ + +	+ + +
	70,000	+	+ +	+ +	+ +	+ + +	+ + +	+ + +	+ + +	+ + +
	7,000	0	0	+	+	+	+	+ +	+ +	+ + +
	700	0	0	0	0	+	+	+ +	+ +	+ + +
	70	0	0	0	0	0	+	+	+ +	+ + +
	7	0	0	0	0	0	0	+	+ +	+ + +
Case 4 ..	300,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	30,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	3,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	300	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	30	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	3	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +

0 = no growth, + = slight growth, + + + = maximal growth in a forty-eight-hour culture.

TABLE II.—*Growth of Strep. viridans Strains isolated from Cases 1 to 4 in Broth containing Varying Amounts of 4:4'-diaminodiphenyl Sulphone*

Source of Organism	No. of Living Cocci in Inoculum	Dilution of 4 : 4'-diaminodiphenyl Sulphone in Broth								Control with no Drug
		1/2,000	1/4,000	1/8,000	1/16,000	1/32,000	1/64,000	1/128,000	1/256,000	
Case 1 ..	2,800,000	+ +	+ +	+ +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	280,000	+	+	+ +	+ +	+ +	+ +	+ +	+ +	+ + +
	28,000	+	+	+	+	+	+	+	+ +	+ + +
	2,800	0	0	0	0	0	+	+	+ +	+ + +
	280	0	0	0	0	0	0	0	0	+ + +
	28	0	0	0	0	0	0	0	0	+ + +
Case 2 ..	1,500,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	150,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	15,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	1,500	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	150	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	15	0	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
Case 3 ..	2,000,000	+	+ +	+ +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	200,000	+	+	+	+	+	+	+	+ +	+ + +
	20,000	0	0	0	0	0	0	0	0	+ + +
	2,000	0	0	0	0	0	0	0	0	+ + +
	200	0	0	0	0	0	0	0	0	+ + +
	20	0	0	0	0	0	0	0	0	+ + +
Case 4 ..	720,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	72,000	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	7,200	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
	720	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ + +
	72	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ + +
	7	0	+	0	0	0	0	0	0	+ + +

0 = no growth, + = slight growth, + + + = maximal growth in a forty-eight-hour culture.

the fermentation reactions and susceptibility to sulphonamide compounds. Table III shows these reactions.

TABLE III.—*Showing the Fermentative Reactions of the Four Strains of Strep. viridans*

	Case 1	Case 2	Case 3	Case 4
Lactose	+	+	+	−
Glucose	+	+	+	+
Saccharose	+	+	+	+
Maltose	+	+	+	+
Inulin	−	+	+	−
Salicin	+	+	+	−
Galactose	+	+	−	+
Raffinose	+	+	−	−
Mannite	+	+	−	−
Neutral red anaerobically	−	+	−	−
Litmus milk	A	AC	A	A
Morphology	Medium-length chain	Very long chain	Long chain	Short chain, ovoid cocci
Colonies	Small, semi-translucent	Small, semi-translucent	Small, semi-translucent	Minute
Haemolysis	α	α	α	α ; very slight
Heat at 60° C. for 30 min.	Killed	Killed	Killed	Killed

A = acid. AC = acid and clot.

Discussion

Strep. viridans is not a species but a heterogeneous group of cocci in many ways widely dissimilar. It is therefore not to be expected that all strains will behave similarly, and the data here presented show that they do not. The method used of testing bacteriostatic action in simple culture is open to the criticism that this effect is not known to be the same as that by which sulphonamide drugs exert their therapeutic effect in the body. If a test of therapeutic action in the experimental animal were available this would be more appropriate, but *Strep. viridans* causes no animal infection which can be used for such a test. A purely *in vitro* method is therefore the only means by which the action of sulphonamide compounds on this organism can be studied. If such a method reveals marked differences in strain susceptibility they must be of some significance. Very marked differences were in fact established, and these corresponded to the therapeutic findings.

Cases 1 and 3 were both cases in which the characters of the disease were apparently influenced by treatment with sulphonamide derivatives. In Case 1 the blood became sterile and remained so throughout thirty-three days of treatment until the patient's death. An interesting fact was the very small size of the vegetations found on the mitral valve at necropsy and the relatively small numbers of organisms which they contained. In Case 3 sterility of the blood was obtained for the first ten days of treatment only. The streptococci isolated from the blood of these two cases proved in the *in vitro* tests described to be susceptible to each of the three drugs tried.

Cases 2 and 4 were both cases in which sulphapyridine, 4 : 4′-diaminodiphenyl sulphone, and sulphanilamide were given intensively during treatment without any alteration in the manifestations of the disease. The streptococci isolated from the blood of these two cases proved to be resistant to the three drugs tested and grew plentifully in their presence.

Thus it appears that some strains of streptococci are resistant to and others susceptible to sulphonamide derivatives. It also seems likely that the strains of *Strep. viridans* which *in vitro* are resistant to these drugs are the causative organism in cases which fail to respond to treatment.

As regards the relative merits of each drug tested, there is little to choose between them, since each is effective against non-resistant strains. 4 : 4′-diaminodiphenyl sulphone is perhaps slightly the more potent *in vitro*, but this advantage is more than offset by the fact that this drug produces signs of intolerance, such as cyanosis, nausea, and vomiting, to a greater extent than does sulphapyridine. Sulphapyridine and its soluble sodium salt have almost identical inhibitory powers. The correlation of the results of the *in vitro* tests and the clinical course of these four cases is striking, but it must not be forgotten that periods of sterility of the blood are well recognized in subacute bacterial endocarditis and that the coincidence of such a period cannot be excluded in these cases.

The existence of strains of *Strep. viridans* resistant to sulphonamides is of importance when consideration is taken of the treatment used by Kelson and White (1939). This treatment comprises the oral use of sulphapyridine accompanied by the continuous intravenous infusion of heparin, and these authors claim good results in three out of six of their cases. This new treatment is as yet untried, but the success of it may well depend on the susceptibility of various strains of *Strep. viridans* to sulphapyridine. It might be worth while, before embarking on a course of treatment which is by no means free from risk, as well as difficult and costly, to determine the degree of susceptibility of the patient's streptococcus to the action of sulphapyridine by a cultural method like that used in these experiments ; a rather more simple form of experiment would probably serve this purpose.

Summary

Four cases of subacute bacterial endocarditis are described, two of which were apparently influenced by treatment with sulphonamide compounds, while the other two were quite unaffected by such treatment.

Simple *in vitro* tests are described in which it is shown that strains of *Strep. viridans* derived from these cases differ in their susceptibility to the three sulphonamide derivatives tried. The two strains isolated from cases which were clinically influenced by treatment were susceptible, whereas the strains isolated from the two cases which resisted treatment were also resistant to the drugs *in vitro*.

It is suggested that the existence of resistant strains of *Strep. viridans* may be responsible for the failure of some cases to respond to sulphonamide therapy.

Sulphapyridine is less toxic than 4 : 4′-diaminodiphenyl sulphone, and its activity only slightly less marked.

The use of shake cultures of the blood is recommended in following cases of subacute bacterial endocarditis.

I am greatly indebted to Professor L. P. Garrod for helpful advice and criticism, to Drs. A. E. Gow, G. Graham, and A. W. Spence for permission to publish cases under their care, to Miss G. E. Root for technical help, to Dr. S. Smith of the Wellcome Chemical Research Institute for supplies of 4 : 4′-diaminodiphenyl sulphone, and to Messrs. May and Baker for supplies of sulphapyridine (M & B 693) and its soluble sodium salt.

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Mr. W. H. Collins of Stoke Poges, chairman of King Edward VII Hospital, Windsor, has promised to give £20,000 towards the cost of rebuilding the out-patient department, installing new boilers, and erecting a restaurant for the staff. During the past eighteen months Mr. Collins has made two donations of £10,000 to the hospital.

SPLINTING FRACTURES OF THE HUMERUS

BY

K. O. PARSONS, F.R.C.S.

Surgeon to Dudley Road Hospital, Birmingham

AND

A. TUDOR HART, M.R.C.S.

Although abduction ("aeroplane") splints for the upper limb are now in fairly general use the types are so various and their application often so indifferent that a description of a simple standard model and of its application may be useful, especially to those war surgeons who have not had experience of work in an organized fracture clinic.

A Simple Aeroplane Splint

The model illustrated (Fig. 1), made of Cramer wire, 10 cm. in width, follows fairly closely that of Böhler, except that the upright portion fitting the patient's trunk is not brought down over the iliac crest. It has been found that this is not necessary to keep the splint well hitched up into the axilla, and that it causes the patient needless inconvenience and even possibly helps to produce that tendency to rotate backwards round the trunk which

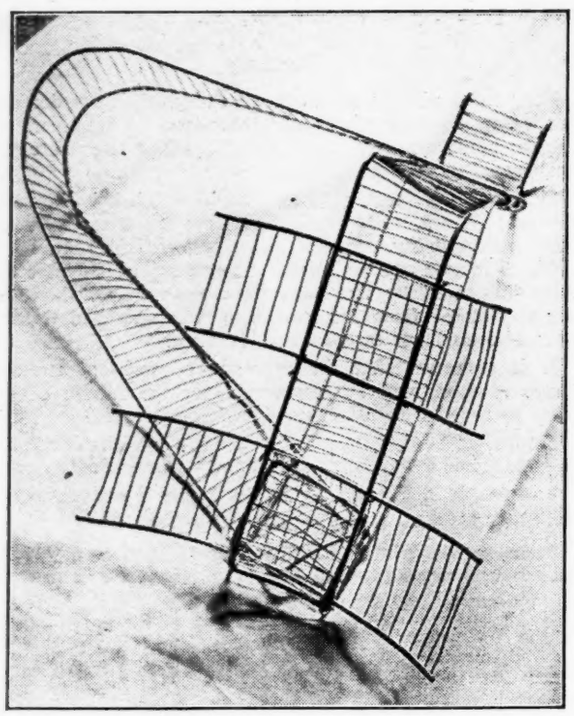

FIG. 1.—Upper limb abduction ("aeroplane") splint, made of Cramer wire, before padding. The splint has been bent unevenly where it is to fit into the axilla, to help prevent the tendency to slip backwards.

is the principal weakness of the Böhler splint. The portion of the Cramer wire that fits into the axilla is bent so that, as seen from the front, the part supporting the arm is at a right-angle with that part which fits against the trunk and lies in the sagittal plane, but, as seen from above, the arm support makes an angle forwards of about 30 degrees with the sagittal plane. When the splint is applied with the vertical part against the lateral border of the trunk from the axilla downwards this forward angulation of the arm support ensures the attainment of the correct position of the arm on the splint, which is indicated below. Incidentally, in making the splint with this forward angulation of the arm support it will be found that the anterior edge of the arm support is at a higher level than the posterior edge. This causes the weight of the arm on the splint to exert a forward thrust which counteracts the tendency of the splint to rotate backwards. The splints are fixed together with wire in the model illustrated. They may, however, quite well be tied with tape so long as this is done tightly. Wire fixation is of course more lasting.

The next job is padding. The splint must be padded with wool or tow, very liberally applied and tightly bound on, so as to give the effect of a firm cushion, like a chair seat rather than a feather cushion. Traction is most simply obtained, for both closed and open fractures of the shaft of the humerus, by the application of an unpadded plaster splint from the deltoid to the wrist only. In supracondylar and condylar fractures the plaster must of course be extended to the metacarpo-phalangeal joints. It is also easier to fix the limb to the splint in plaster than without.

Only in cases of fracture of the neck of the humerus do the disadvantages of plaster outweigh the advantages, especially since full mobility at the elbow can be permitted and encouraged from the start. In these cases strapping is preferable as a means of traction. In all cases the traction to be applied is very slight, a piece of fine rubber tubing being a useful alternative to ordinary tape or twine.

How to Apply the Splint

The application of the splint (Fig. 2) has been very fully described by Böhler. The essential points are: (1) The splint must be *pushed up* into the axilla, thus causing full abduction of the upper fragment, which in cases of

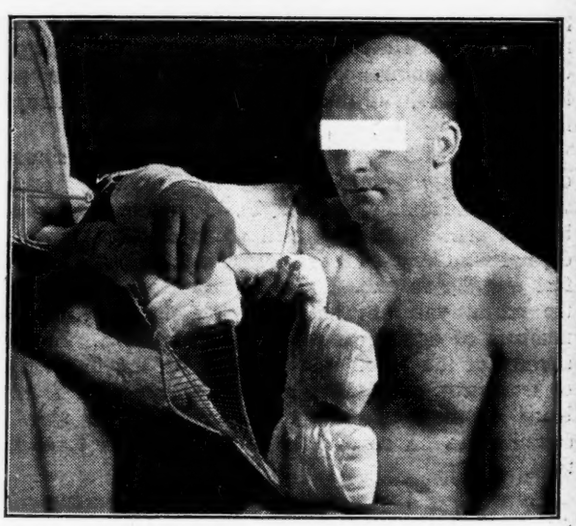

FIG. 2.—Aeroplane splint, well padded, being held well up into the axilla, for fixation to the trunk. The limb is in plaster, to which traction has been applied. (Fracture of the humerus.)

fracture of the shaft is pulled down as well as forward by the pectoral. (2) The splint *must* be applied with the arm brought forward to form an angle of 45 degrees with the sagittal plane, and not, as many textbooks still illustrate, brought out straight from the side (Fig. 3). This is absolutely essential for correct alignment of the fragments, owing to the forward pull of the pectoral. The patient's hand should be almost opposite his nose (Fig. 4).

The fixation of the splint can be secured in a variety of ways. The basis is open-wove bandaging, overlaid with plaster-of-Paris, starch bandages, or, as in the case illustrated, with elastoplast bandaging (Fig. 4). It is usually advisable to bring some turns of the bandage from the bottom of the splint over the opposite shoulder, but the splint depends for its efficiency on firm bandaging to the *opposite* shoulder (Fig. 4), which should be well

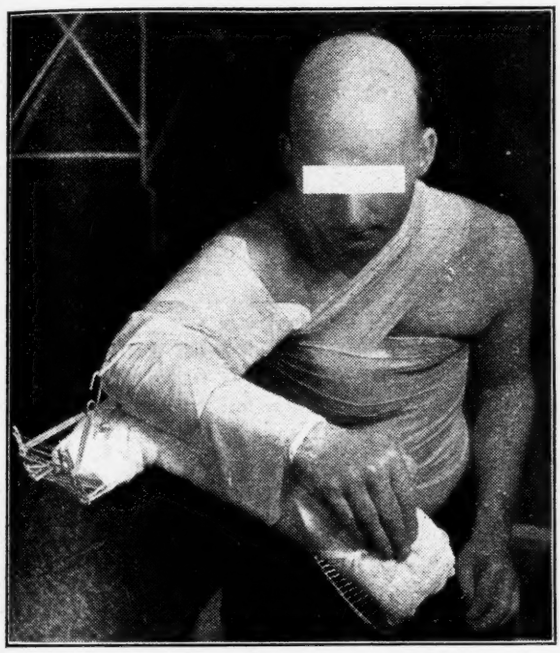

FIG. 3.—In applying the splint the arm is brought forward to form an angle of 45 degrees with the sagittal plane.

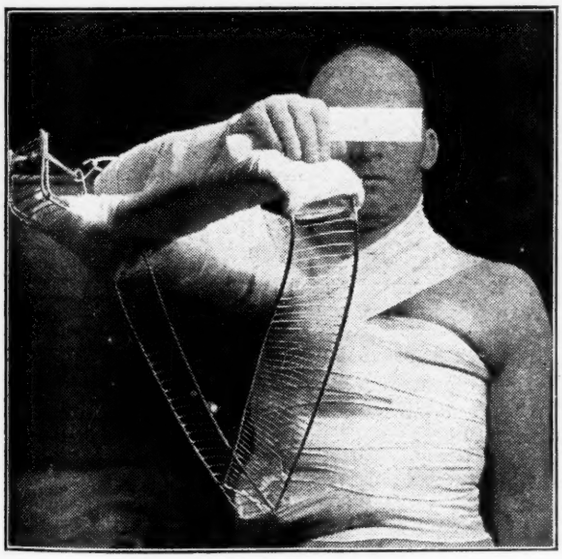

FIG. 4.—Final position of the splint.

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This splint, once well applied, can remain untouched for two or three months. It is a great advantage to leave it on for a time after the fracture is well consolidated and full movements are allowed. There is never any difficulty in regaining adduction at the shoulder-joint, and the support afforded by the splint facilitates the development of a full range of other movements. The splint should be finally removed only when these movements are fairly full and of course painless.

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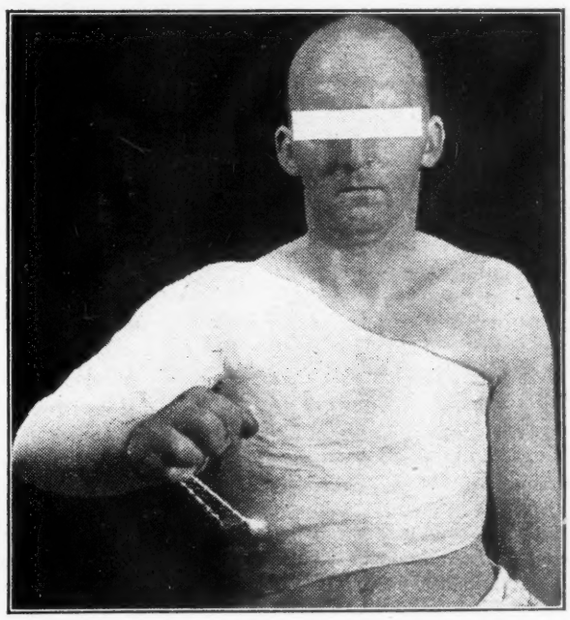

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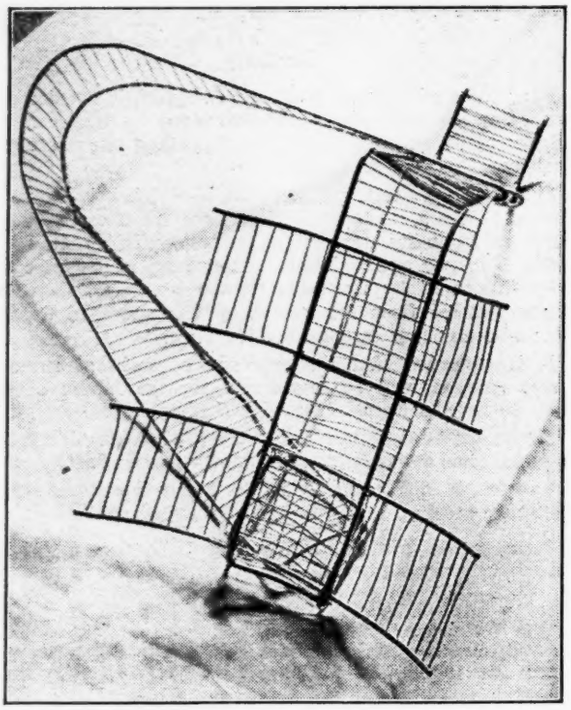

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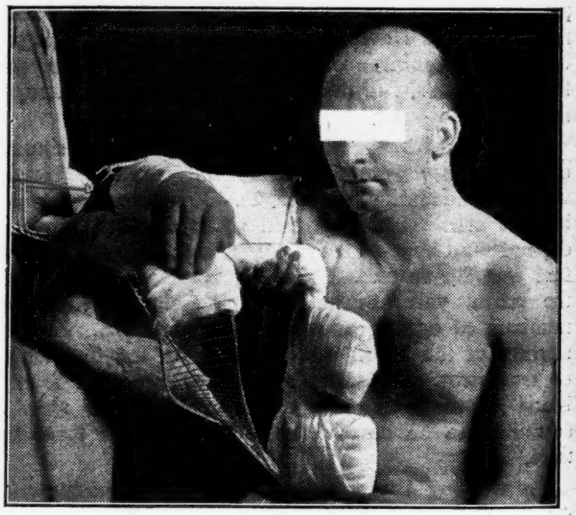

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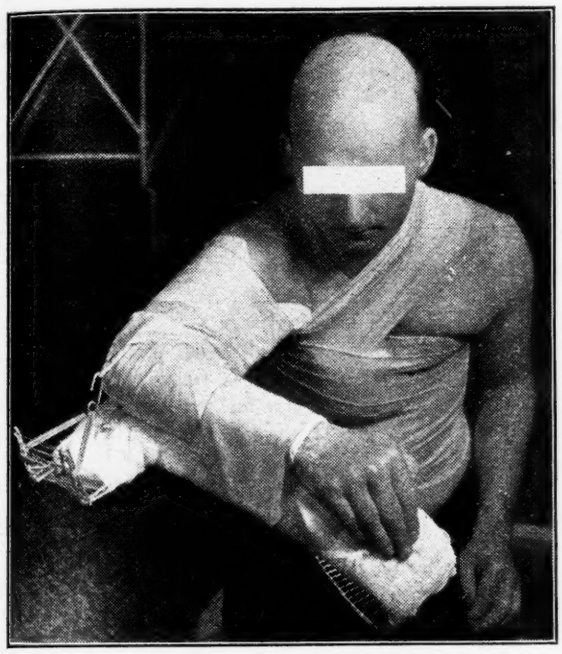

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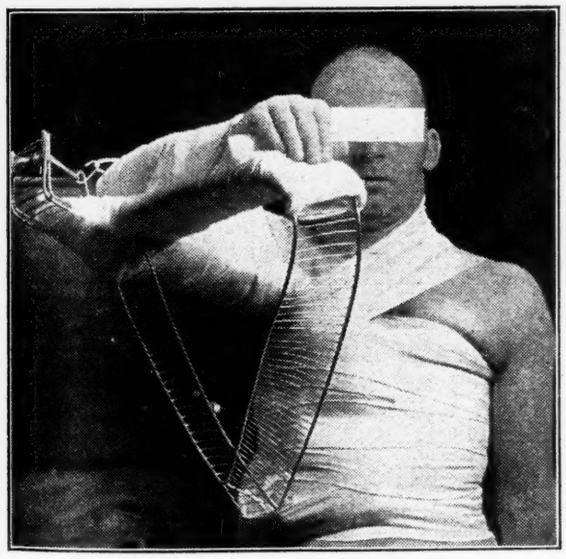

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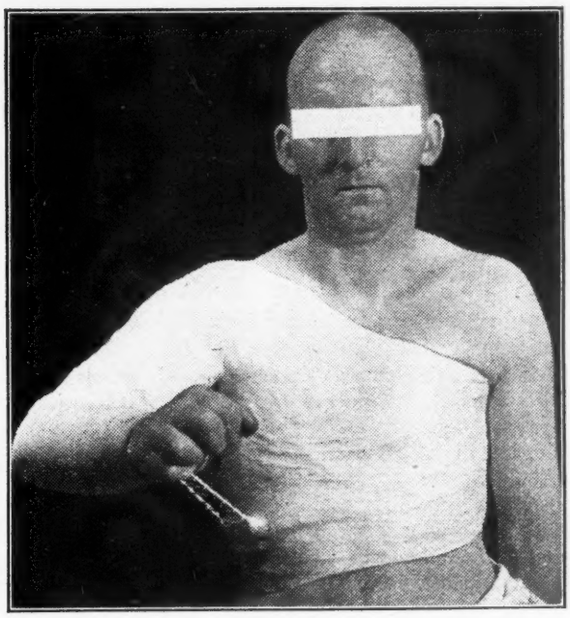

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elevation and because there is no advantage in completely immobilizing the shoulder-joint, which of course is never quite immobilized on an abduction splint.

Comment

The application of either splint is really not difficult and merely requires a little practice, which can be put in with great advantage on orderlies or assistants until the surgeon, or whichever member of his team is to do the actual job, is able to carry it out quickly, easily, and confidently. But it is quite essential to have the patient's conscious co-operation, and for this reason neither abduction splint nor plaster should ever be applied to a patient just recovering from an anaesthetic. If a general anaesthetic has been given the arm should merely be bandaged to the trunk as in the first-aid treatment of a fracture, and the splint or spica applied as soon as the patient has fully recovered from the anaesthetic. Skilled and gentle application, especially with an intelligent and skilled assistant to hold the limb *under slight traction*, is practically painless.

DIPHTHERIA PROPHYLAXIS

OPTIMUM DOSAGE AND TECHNIQUE IN USE OF ALUM-PRECIPITATED TOXOID

BY

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Of the reagents available for the specific prevention of diphtheria there can be little doubt that, volume for volume, the most highly antigenic is alum-precipitated toxoid (A.P.T.), the preparation of which was first described by Glenny and Barr (1931a). Thus, its value is widely appreciated and utilized in the immunization of horses; laboratory experiments on guinea-pigs have shown A.P.T. to be a better antigen than unmodified toxoid (Park, 1937; Jones, 1938), and Glenny and his colleagues (1931b) have provided the explanation of why this should be so. In human work, when used by one injection, its results, while admittedly erratic, are unapproached by those of any other compound employed as a single dose; while when used in two doses, as it always should be, it consistently produces a Schick-negative rate of over 98 per cent. (Chesney, 1938, 1939; Parish, 1936; Thomas, 1937; Lewis, 1939b, 1939c). Even, however, when two injections are employed the procedure may be open to improvement, as it is the purpose of this paper to demonstrate.

Many workers have carried out antitoxin estimations on the blood of persons injected with two doses of A.P.T. (Jones and Moss, 1937; Fraser and Halpern, 1937; Schall, 1938; Paschlau, 1939; Volk and Bunney, 1939). For the most part these have been on small numbers of cases tested about three months after the second dose. Until, therefore, antitoxic estimations on a large scale are performed knowledge of the exact degree of antigenicity of A.P.T. in man must remain vague and conjectural. An attempt at such an investigation is now being made in Croydon, under the supervision of Dr. O. M. Holden.

Blood Antitoxin Values Sixteen Months after Two Injections of A.P.T.

It is not possible at this stage to give the full results of this inquiry, which is still proceeding. When A.P.T. was first used in Croydon, some two years ago, it was given in a dosage of 0.1 c.cm. followed in a fortnight's time by 0.5 c.cm. in the same arm. Although it was realized that, immunologically, a month's interval was better, it was considered that a fortnight's interval, under the circumstances then prevailing, presented fewer administrative difficulties. Of the 100 cases so treated it has been possible after a mean period of sixteen and a half months to obtain blood samples from forty-nine. All cases were originally Schick-positive, and the mean age of the children at the time of inoculation was 9½ years. All the cases were from two schools that had experienced a mild outbreak of diphtheria for some weeks before and during the time when the inoculations were being given. The antitoxin levels obtained were as follows.

Distribution of Blood Antitoxin in Forty-nine Children Sixteen Months after the Second of Two Fortnightly Injections of A.P.T. (0.1 *and* 0.5 *c.cm.*)

	Antitoxin Titre in Units per c.cm. of Blood											
	5	2	0.5	0.35	0.2	0.1	0.04	0.02	0.01	0.004	0.002	0.001
No. of children	1	1	1	1	2	5	9	7	11	7	2	2

Parish and Wright (1938) have pointed out that antitoxic immunity must be regarded quantitatively as there is no fixed level of immunity. An arbitrary level may be taken to be from 0.005 to 0.05 antitoxic unit per c.cm., a scatter of 0.045 A.U. around 0.01 A.U. In this way the above forty-nine children may be grouped into three classes: (1) Eleven, or 22.45 ± 6.1 per cent., had more than 0.05 A.U. per c.cm., which should be enough to neutralize the toxin produced by any but the most massive infection: these are immune. (2) Twenty-seven, or 55.1 ± 7.6 per cent., had between 0.005 and 0.05 A.U.: while these have less antitoxin than the previous group they may still be considered potentially immune. (3) Eleven, or 22.45 ± 6.1 per cent., had less than 0.005 A.U. per c.cm. It is conceivable that sudden invasion with large numbers of virulent organisms (as from an actual case) may cause clinical symptoms in cases of this group before they can react to the secondary stimulus: these are potentially susceptible. Allowing for chance variations, this proportion —22.45 ± 6.1 per cent.—is unlikely to differ by more than twice its standard error in samples of the same size; that is, it may be 34.65 per cent. or 10.25 per cent. If this lower figure is taken it may be felt that 10 per cent. is an undesirably high proportion to have as little as or less than 0.005 A.U. only sixteen months after the injections, for this level may not give high protection against sudden invasion by virulent organisms. It is therefore necessary to consider means of increasing the antigenic effect.

Greater efficiency may be obtained in two ways without raising the total number of injections. First, the only reason for limiting the initial dose to 0.1 c.cm. is the fear of reactions. The results in the Croydon cases demonstrate quite clearly that little or no trouble will be experienced in children below 8 years, and, therefore, below this age the initial injection should be 0.5 c.cm., as Bousfield (1938) has suggested. Over 8 years it is wise to limit the dose to 0.25 c.cm. Chesney (1939) quotes work by Jensen (1937) as suggesting that there is "no immunological advantage in giving 0.5 c.cm. as an initial dose." While this may be so, it is quite common to find, even with careful work, a certain quantity of antigen escaping from the puncture when the needle is withdrawn, and in many cases it is likely that the effective dose is less than that actually injected. By giving 0.25 or 0.5 c.cm. allowance is made for this. The interval between the injections should never be less than one month.

Another observation of some interest, and perhaps of value, is the following. Accurate records were not kept, their possible significance not being realized, but it was noticed that the second injection of A.P.T. at the same site as the first may not cause any increase in the amount of induration which, as is well known, forms at the site of the first injection. The first injection causes local hyperaemia, with congestion of the tissues and increased lymph flow—the normal response to the presence of a chemical irritant. When the second dose is given in the same place as the first, compensatory hyperaemia is already present, and so the A.P.T. is removed more quickly, the slow absorption and consequent prolonged antigenic action, which Glenny, Buttle, and Stevens (1931b) showed to be so important, being counteracted. To obviate this the second injection should be made in the opposite arm ; in this way, by ensuring protracted absorption, the maximum effect is likely to be produced.

Conclusion

Allusion has been made elsewhere (Lewis, 1939a, 1939b) to the many methods by which anti-diphtheria schemes in this country are conducted. According to a survey of the schemes of some 150 of the larger urban authorities, made by means of a questionary issued by Dr. O. M. Holden, A.P.T. by two injections is used in about 40 per cent. of those studied, in many cases in a dosage of 0.1 c.cm. and 0.4–0.5 c.cm. at fortnightly or three-weekly intervals. A.P.T. by at least two injections, properly spaced and given in adequate dosage, possesses so many advantages over other antigens that it would be a misfortune of the greatest magnitude if it should fall into disrepute through wrong technique. It will be shown in a later paper that in two doses of adequate size, and properly spaced, it will give results that compare very favourably with those given by three doses of unmodified toxoid. Few would cavil at the desirability for some measure of uniform practice in diphtheria immunization, which undoubtedly is greatly hampered by the lack of such a standard. A.P.T. in two injections, with the modifications here advocated, supplies this need, and could with advantage be utilized by all authorities responsible for the control of diphtheria. It is of the utmost importance, however, that proper methods be used. Those advocated are: (1) the dosage to be 0.5 c.cm. and 0.5 c.cm. in children under 8 years ; in children of 8 years or more the first dose to be 0.25 c.cm., to be followed by 0.5 c.cm. if there is no reaction ; (2) the interval between the doses to be in no case less than four weeks ; (3) the injections to be given in opposite arms.

Summary

The results are given of antitoxin titrations in forty-nine children who were bled sixteen months after 0.1 c.cm. of A.P.T. followed in two weeks by 0.5 c.cm.

It is shown that sixteen months after A.P.T. administered in this fashion at least 10 per cent. of children may be susceptible to a large dose of virulent organisms.

Certain modifications in dosage and technique are advocated as a means of increasing the antigenic effect without increasing the number of injections. It is suggested that this procedure may with advantage be adopted by all scheme-making authorities.

I am indebted to Dr. O. M. Holden and Dr. D. D. Payne for help in the preparation of this paper, and to the former for permission to publish it. Also to Dr. H. J. Parish and Mr. A. T. Glenny, of the Wellcome Physiological Research Laboratories, for making available their wide knowledge and experience ; and to Mr. Glenny for performing the blood antitoxin estimations.

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BENZEDRINE SULPHATE

ITS USE TO INTERRUPT AVERTIN ANAESTHESIA

BY

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Avertin, used as a basal anaesthetic, has the great disadvantage that once it has been absorbed into the system it cannot be withdrawn. The counteraction of avertin, and especially of an overdose, has attracted the attention of many observers. Bolliger (1932) experimented with sodium thiosulphate, and he found that although this drug prevented the onset of narcosis it was of no avail in counteracting an overdose. Pribram (1929) experimented with thyroxine to expedite the detoxication, but considered that the drug acted too slowly to be of service in an emergency. Caffeine sodium benzoate has also been tried (Herzberg, 1928 ; Speidel, 1930). This was found to interrupt avertin anaesthesia in animals, but its action as a respiratory stimulant in man is doubtful, although Herzberg claims that it interrupts avertin narcosis, with slowing and deepening of respiration. Ephedrine has been used (Widenhorn, 1932) with a view to the restoration of the fall in blood pressure. The rise produced is not evident in all cases. Adrenaline frequently produces cardiac irregularity, and in heart–lung preparations ventricular fibrillation is sometimes seen. Kennedy (1932) observed that the first inhalation of ether often produced a marked improvement in the patient's condition. Those patients not benefited by ether were rapidly relieved by the administration of 5 per cent. carbon dioxide in oxygen. Killian (1931), Mörl (1931), and Kennedy (1932) tried coramine and found it an even better antidote. In man 2 to 3 c.cm. of coramine injected intramuscularly, and repeated if necessary, interrupted light avertin anaesthesia and counteracted the cardiac and respiratory depression. Mörl gave 3 c.cm. intravenously. If the anaesthesia is deep the injection of coramine, while helping the general condition, permits of the operation being carried on without further anaesthetic being given.

More recently benzedrine sulphate has been tried by Michelsen and Verlot (1939). They found that animals were protected from the deleterious effects of a lethal dose of avertin by the use of a preliminary intramuscular injection of benzedrine sulphate and that benzedrine given after avertin shortens the anaesthesia by about 50 per cent. They tried the drug in man in five cases, and report that, given 0.08 to 0.09 gramme of avertin per kg. of body weight and subsequently 20 mg. of benzedrine sulphate, the patients "opened their eyes, reacted readily to pain stimuli, gave clear answers, followed commands.

calculated, and so forth. The blood pressure rapidly rose and stayed elevated for two to five hours."

Results of Present Test

This report deals with the use of benzedrine sulphate solution in ampoules—kindly supplied by Messrs. Menley and James—in the cases of twelve children given a relatively larger dose of avertin than that employed by Michelsen and Verlot. Each child had received a dose of avertin equivalent to 0.16 gramme per kg. of body weight. Supplementary anaesthesia was necessary in six cases. All the patients except one (who received 5 mg.) were given 10 mg. of benzedrine sulphate dissolved in 1 c.cm. of distilled water. This was administered intravenously immediately after the operation. The immediate reactions and the length of time before the child had recovered sufficiently to answer questions were noted, and the following observations were made:

Immediate Response.—The patients usually roused a little after the injection of the benzedrine sulphate. Within a few minutes the corneal reflex was present and the patients tended to resist painful stimuli and moved about restlessly. Only one spoke just after the injection. She uttered a few unintelligible words and went off to sleep again. In the others there was no response even to shouting.

Post-operative Sleep.—In those patients who were sufficiently anaesthetized with avertin not to require additional inhalation anaesthetic the average duration of post-operative sleep was four hours. In those needing supplementary anaesthesia the average duration was two and a half hours. This represents a considerable reduction in post-operative unconsciousness as compared with cases not receiving benzedrine, the average time in these patients being six and three-quarter hours (Boyd, 1935).

Condition of Patients.—Instead of the usual circulatory and respiratory depression after operation, characterized by pallor and shallow respiration, the patients were flushed, had a good respiratory excursion, and showed improved pulse volume and rise in blood pressure.

Post-operative Vomiting.—This was present in all cases but one, and was severe in 75 per cent., the patients retching all the evening and in some instances right into the next day. Of those given avertin alone five (82 per cent.) vomited. Vomiting occurred in all the cases in which avertin anaesthesia had to be supplemented. This is in marked contrast to control cases not given benzedrine sulphate: in these the figures for the unsupplemented and the supplemented anaesthesia were 9 per cent. and 17 per cent. respectively (Boyd, 1935).

Two cases call for special mention. One, a girl aged 7 in preparation for appendicectomy, returned some of the avertin solution and was conscious while coming to the theatre. She was given open ether. Two minutes after the administration of the benzedrine sulphate, and before leaving the table, she vomited, and continued to vomit all the evening. She had recovered consciousness sufficiently to answer questions twenty minutes after the benzedrine was given. The other case was interesting in view of the fact that the previous week the patient had been given a similar anaesthetic but without the benzedrine. After the first operation he slept six hours, had no post-operative vomiting, and had a normal peaceful awakening. On the second occasion, after the benzedrine, he slept three hours only, was a little strange in manner on wakening, and vomited a lot all the evening.

Summary

Benzedrine sulphate, 10 mg., was given to children after avertin anaesthesia.

The only immediate effect was the return of the superficial reflexes.

There was a definite reduction in the duration of the post-operative sleep as compared with control cases.

Most of the patients vomited profusely after the benzedrine sulphate.

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Clinical Memoranda

Acute Appendicitis in a Baby

The following somewhat unusual case of acute appendicitis in a baby aged 8 months is, I think, worth recording.

CASE REPORT

A breast-fed baby boy aged 8 months was admitted to hospital on February 14 with a history of having vomited repeatedly (but not all feeds) for three days. He had been fretful and whimpering, occasionally drawing up his legs when crying. The stools were said to have been quite normal.

On admission the baby was very well nourished, and weighed 19½ lb. The temperature was 98°, pulse 120 (volume good), and respirations 48. He was very apathetic, slightly cyanosed, and showed marked dyspnoea. From time to time he started to whimper and draw up his legs. The chest, heart, and lungs were normal. The left side of the abdomen was soft, and the child ceased to cry and appeared more comfortable when slight pressure was applied to this side. The right side seemed slightly more resistant, and I thought I could feel a small sausage-shaped lump lying transversely just above the umbilicus. Per rectum nothing abnormal was felt.

In the evening the eyes were sunken and the breath smelt of acetone. Since admission the baby had been fed on small amounts of glucose water and had vomited only once, the vomit looking somewhat dark. The abdomen, however, was then quite soft and no resistance was felt anywhere. In the absence of any definite signs in the chest or abdomen or abnormal stools, and in view of the baby's facies and marked apathy, a tentative diagnosis of a cerebral or meningeal condition was made. At midnight the child was drowsy. Lumbar puncture produced clear fluid, not under pressure. This fluid was reported on by Dr. J. Kilian Clarke, Ransom Memorial Laboratory, Nottingham, as follows: "Faintly blood-stained fluid with no coagulum. Chlorides, 0.73 per cent.; sugar increased; albumin, 0.06 per cent. Films show no apparent increase in white cells; no micro-organisms seen." The condition remained practically unchanged during the next day. He vomited twice. The stools were normal. On the third day in hospital (sixth day of illness) the temperature was 102° at 10 a.m., and the pulse was very rapid and feeble. Fine crepitations were heard at both bases. The baby collapsed early in the afternoon and died.

Post-mortem Findings.—The brain and meninges macroscopically were normal. The chest and heart were normal. Both lower lobes of the lungs were congested, and there was a small amount of pus in the bronchioles (a condition which I presumed to be terminal, not causative). The stomach and transverse colon were much dilated. The whole of the caecum and lower part of ascending colon were firmly adherent to the parietal peritoneum and were much discoloured. An appendix almost three inches in length with a kinked tip was found adherent to the caecum. The tip was gangrenous and on the point of perforation. Other organs were normal.

I am indebted to Dr. Warnecke for permission to report this case.

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Reviews

OCCUPATIONAL SKIN DISEASES

A Textbook of Occupational Diseases of the Skin. By Louis Schwartz, M.D., and Louis Tulipan, M.D. (Pp. 800; 116 photographs. 45s. net.) London: Henry Kimpton. 1939.

This volume, which we believe is the first treatise dealing with the subject of occupational diseases of the skin emanating from America, is an important production. One of the two authors, Dr. Schwartz, is not only a dermatologist but is also medical director of the United States Public Health Service, and hence approaches the subject from a somewhat different point of view from that of the ordinary physician. He sees personally at least some of the manufacturing processes which give rise to trouble. The extent of the subject is in proportion to the vastness and variety of modern industrial operations, and it may truly be said that no occupation except perhaps the purely clerical is free from some slight risk to the skin, although, of course, the degree of hazard varies enormously in different trades. The authors have done their best to make the treatise comprehensive and up to date. Melancholy evidence of their zeal in this direction is afforded by a chapter on war gases, which includes not only the risks (not inconsiderable) faced by those who are engaged in their manufacture but also by the prospective victims!

The last chapter of this work consists of a list of about 400 different chemical compounds known to act as skin irritants, with a short summary of the conditions under which they are met with in industrial life. It alone provides an impressive body of testimony to the importance of industrial skin disease. The attitude of the legislature in various countries towards the mass of sufferers from this form of industrial hazard differs greatly. It appears that Germany and France were the first countries to extend the principle of compensation for industrial accidents to the incidence of skin disease, but there is no doubt that the most complete protection is given to the worker in Great Britain and the other parts of the British Empire. In the U.S.A. the law varies immensely in different States; there are actually two States which still have no workmen's compensation laws at all, and the principle of compensation for industrial disease is in general of quite modern growth. It was only in 1928 that the United States Public Health Service organized the Office of Dermatoses Investigations, presided over by one of the authors of this textbook, Dr. Schwartz, and since then most of the States have adopted laws which afford protection to the worker against the risk of industrial diseases of the skin. Before 1928 it was almost impossible for him to obtain any compensation for industrial disease. No doubt Dr. Schwartz has taken his full share in bringing about this great change.

For the book as a whole we have little but praise. It is well arranged and well written, and a noteworthy feature is the numerous descriptions of various manufacturing processes showing exactly how the worker becomes exposed to the many noxious substances which he has to handle—or, in the case of vapours and liquids, to avoid. There are over 100 good and interesting photographs. Perhaps the weakest points in the whole volume are the chapters on therapy and on malingering, which are very short and scrappy; either these subjects should have been omitted altogether or they should have been adequately dealt with. However, few of those who read this book will consult it for methods of treatment, but rather for knowledge of the manifold kinds of industrial skin diseases and the conditions under which they may arise. Here they are not likely to be disappointed. It will be very useful to all interested either in industrial disease or in dermatology.

UTERINE ACTION

Physiology of the Uterus, with Clinical Correlations. By Samuel R. M. Reynolds, M.A., Ph.D., Associate Professor of Physiology, Long Island College of Medicine, Brooklyn, N.Y. With forewords by Professor George W. Corner, M.D., and Professor J. Chassar Moir, M.D., F.R.C.S., F.R.C.O.G. (Pp. 447; 44 figures. 42s. net.) London: Hamish Hamilton, Ltd. 1939.

Nearly two thousand five hundred years ago Hippocrates expressed very definite views on the physiology of parturition. As recently as 1847 William Frederick Barlow, in writing to the *Lancet*, said: "There can scarcely be a more interesting and important inquiry to the physiologist than the nature of uterine contractions, and certainly it requires further investigation." Since this was written the number of workers who have contributed to our knowledge of uterine action has steadily, and at times rapidly, increased. During the last ten years this has been particularly true, though all too often confusion has been produced by conflicting data. The whole subject of the physiology of the uterus has now been reviewed and published for the first time, and for the masterly way in which he has accomplished this difficult task Dr. Reynolds must be credited with producing one of the outstanding scientific publications of the present day.

The book is written to appeal to "those interested in obstetrics, students as well as physicians, whose interest in the subject is academic as well as immediately practical, and who believe that an appreciation of the fundamental aspect of their work has merits because it renders many clinical procedures they employ less empirical." This appeal is maintained throughout the book, which in thirteen chapters unfolds the story of uterine action in a manner both fascinating and stimulating. It opens with a study of the patterns of uterine motility, which is followed by a detailed discussion of every aspect of hormonic control of the myometrium and a review of the factors affecting uterine growth. Vascular and lymphatic changes in the uterus, and circulation and respiration in the gravid organ, receive two chapters, which are followed by an account of uterine metabolism. The concluding five chapters are of great clinical importance. They deal with physical aspects of uterine contractility and the estimation of ovulation time in women; the innervation of the uterus; the influence of the uterus on certain bodily functions; physiological relationships in the uterus at term; and the physiological basis of treatment in uterine muscle disturbances. Something of the work involved in compiling this book may be estimated from the fact that detailed references are given to 1,190 publications. The bibliography alone is worth the price of the book to those interested in the research aspects of the subject. The careful but generous assessing of the values of experimental evidence, and the lucid presentation of facts, remind one of the impartial summing up of a judge during a difficult technical case. The reader feels that here is an unbiased and earnest search for truth by an honest observer who not for one minute questions the honesty of those workers whose results merit his criticism. When evidence is conflicting we are reminded that "one must rely on physiological interpretations rather than upon

philosophical speculations, and realise that a few experiments well done are worth many hundreds done under unfavourable or misunderstood conditions, for clearly the human uterus does not behave in one way for one group of investigators and in quite a different way for another."

This is a grand book. It will be appreciated most by research workers, but it should be in the library of every thoughtful obstetrician and gynaecologist.

NUTRITION IN INDIA

Bibliography of Nutrition in India. By N. Gangulee, C.I.E., Ph.D. With a foreword by W. R. Aykroyd. (Pp. 80. 4s. 6d. net.) London: Oxford University Press. 1940.

Dr. N. Gangulee, whose important book on the relation of nutrition to the health of Indian peoples was reviewed in this *Journal* last year, has now published a *Bibliography of Nutrition in India* which research workers and others interested in the subject will find useful. In it there are brought together close on 900 works, most of which deal with the problem of nutrition in that country: a country whose inhabitants number some 400 millions, made up of many different races of widely differing physique and health. In such a country the problem is great, its aspects many, and the opportunities for its study unlimited. Indeed, as Dr. W. R. Aykroyd points out in his foreword to the book, "the mere titles of the works included draw attention to the extent of the problem, its multitudinous aspects, and its importance to India." In it there are works dealing with India's food resources, the regional distribution of food crops, agricultural practices, indigenous foodstuffs and their analyses, marine foods, spices, and condiments, as well as others which have to do with economic and social conditions: standards of living, food prices, budget analyses, caste and creed in relation to food habits and food restrictions. It includes, also, many works on nutrition and national health, on specific deficiency diseases (beriberi, scurvy, anaemias, rickets, osteomalacia, dental caries, keratomalacia and blindness, pellagra, stomatitis, oedema, and goitre), and on maladies (sprue, urinary calculus, peptic ulcer, infantile biliary cirrhosis, epidemic dropsy, lathyrism, and combined degeneration of the spinal cord) in whose genesis food deficiencies may play some part. There are many papers the titles of which tell of the pathological, histological, haematological, metabolic, chemical, biochemical, spectroscopic, and tissue-culture studies of their authors. In short, the *Bibliography* makes it evident that workers in India have explored many avenues and contributed much to knowledge of a subject whose importance to the well-being of peoples of all lands becomes daily more manifest. As a bibliography the arrangement of the material might have been better.

A WOMAN DOCTOR IN CHINA

My Days of Strength: A Woman Doctor's Forty Years in China. By Anne Walter Fearn, M.D. Foreword by Carl Crow. (Pp. 288; illustrated. 12s. 6d. net.) London: Robert Hale Limited. 1940.

In this well-named book, *My Days of Strength*, Dr. Anne Walter Fearn tells of her activities in China during a period which was contemporaneous with the transition stage from crude native empiricism to the Western standards of scientific medicine which are now in large degree permeating that country. The author graduated at San Francisco in 1893 and the same year went to China to work for a year or so in an inland general hospital. Instead, she remained for forty years, and during that time was in close contact with the Chinese people, rich and poor. In her earlier times the mere thought of a surgical knife was anathema to them, and her fearless insistence on taking what she felt was the right course, even though it involved a major operation sometimes, landed her in difficulties. On one occasion a mob raged round the hospital. The first half of her professional life was at Soochow, where she noted that "China's ignorance of sanitation is beyond belief. It frequently seemed to me that the continued existence of the Chinese was nothing short of a miracle, explainable only by the theory of germ saturation. Presumably the Chinese enjoy comparative immunity, so that a few million germs count for nothing." Before she left she could say that not only were there many scientifically trained Chinese doctors but that "Government officials, too, were liberal in the furtherance of public welfare."

Dr. Fearn was a general practitioner in every sense of the word. Medicine, surgery, obstetrics, public health—she knew enough of each subject to deal efficiently with it. Her patients ranged from high officials down to infected prostitutes, and a great deal of her work was philanthropic. The volume is a series of interesting incidents, vivaciously and truthfully told. She was a cheery, clever, selfless woman who lived to be of use to others. There is not a dull page throughout, and medical men will find much in the book that will stimulate them in the psychological management of their cases. The author had the gift of establishing friendship and confidence between herself and her many patients. Not long after the American publication of this volume Dr. Fearn died, but not before she had had the satisfaction of knowing that it had become a "best seller" in the U.S.A.

SPECULATIONS ON TUBERCULOSIS

Les Tuberculoses Atypiques. Fréquence, Polymorphisme, Intérêt Thérapeutique. By André Jacquelin. Foreword by Professor F. Bezançon. (Pp. 354; 20 figures. 70 fr.) Paris: Masson et Cie. 1939.

Clinical speculation when divorced from a sound pathological basis has tempted many an author to beget a monster of whose fertility he is apt to lose control. Tuberculosis, because of the obvious gaps that exist in our knowledge, has proved an excellent field for such speculation. Work like that of Loewenstein on tuberculous bacillaemia and of the French school on the filterable virus, though soon widely discredited by experienced bacteriologists, has therefore been seized upon with avidity by those who see in the tubercle virus a cause for almost all illness from which the human race suffers. Dr. Jacquelin insists that he can provide no proper pathological background for the clinical syndromes he describes, but is nevertheless uncritically willing to allow the allergic state following primary infection and vague generalizations about tuberculous toxaemia to account for the following conditions, while telling us that he is confining himself to "the clinical description of a relatively restricted number of important syndromes which really belong to current medical practice, and of which the relations with tuberculosis, though frequent and close, are not well enough known; or, even if known, are not considered by most physicians to admit of the therapeutic measures inherent to this pathogenesis." These clinical syndromes are: types of pulmonary tuberculosis simulating an acute pneumonitis (simple pulmonary congestion, pleuropneumonia, pseudo-influenzal forms, intricate corticopleurisies), atypical tuberculosis with the form of repeated rhino-tracheo-bronchitis, tuberculous asthma, tuberculous rheumatism (the tuberculous origin of this he considers

as no longer doubted by anyone), atypical tuberculosis assuming the forms of prolonged febrile states, states of general debility, dysendocrine syndromes, neuropsychic syndromes, hepato-digestive attacks, and peripheral circulatory disturbances. Tuberculosis is even allowed to play a part in the production of abnormal morphological types and temperaments. The diagnosis of this rich variety of disease conditions rests on the clinical behaviour, the family history, radiological signs of a primary tuberculous infection, the Pirquet test, and, above all, the reactions to the subcutaneous tuberculin test. The therapeutic test as shown by improvement following the administration of gold and tuberculin is conclusive.

The author's prolixity (and constant repetition), his acceptance of the claims for Loewenstein's findings, and the work on the ultravirus, together with the extent to which he pushes his theory, cannot but prejudice the reader. But the case histories Dr. Jacquelin quotes are detailed and interesting, and there is no doubt that the subcutaneous tuberculin test and tuberculin therapy have not been adequately studied in the light of modern developments in the diagnosis and assessment of tuberculosis, so that in spite of the severe criticism expressed by the reviewer he feels that Dr. Jacquelin's monograph is deserving of study.

Notes on Books

Cheery optimism and a zest for life are valuable assets in the practice of medicine when combined with sympathy and ready resource. That Dr. EDWARD FURBER possesses these characteristics will be evident from his volume of recollections, *London Doctor*, and is of course well known to his large circle of friends. He has worked hard and played hard; he enjoys his profession and his sport with almost equal intensity. When a colleague remarked that his own son was "far too good" for a medical career Furber's comment was, "No man can be too good for the medical profession, but I am afraid that there are many who are not good enough." He maintains that it is wrong for anyone to enter the profession who does not love the work enough to put it before everything else. "It is of no use being disgruntled when one's plans are upset by some urgent request over the telephone—it requires a special temperament." It does! Fortunately for his patients and himself he possesses it, and it has made him a favourite among all classes of the community. No doubt he learned to be adaptable early in life, for he was the eldest son of the second eleven of a family of twenty-two! Entering St. Bartholomew's Hospital as long ago as 1881, he has seen many changes in the world of medicine, on which he has some shrewd comments to make. Sir Girling Ball contributes as a foreword a charming and just appreciation of the author. The book is published by Geoffrey Bles at 10s. 6d.

The Care of a Small Rat Colony, by ROLLAND J. MAIN, is published at 10s. by Kimpton. Through lack of a suitable manual on the care of rats the author wasted much time and money in developing satisfactory methods. He has set down the results of his experience for the guidance of others who have occasion to start a rat colony or who wish to improve on their existing practice, and he has aimed at providing an account which would enable a previously inexperienced technical assistant to learn the job by himself. The book fulfils its purpose. There are clear descriptions of such matters as rooms and their equipment, breeding, feeding, and control of disease; and a daily routine is outlined. One chapter is devoted to the assay of vitamin D in milk with which the author is especially concerned. The cost of equipment and maintenance is given in detail. The book is American, and the British reader is at a disadvantage in checking the financial details, but it is probable that many workers will find it imperative to use less expensive methods. A less elaborate procedure, adapted to the work in progress, is used with success in many laboratories. The efforts required in Virginia to protect rats against high temperatures when the thermometer registers 100° F. outdoors are rarely demanded here. Allowance must be made also for the contrast between American and British conceptions of what is a convenient and comfortable room temperature in winter. The book may be commended to those for whom it is intended, with the recommendation that they should not despair if they cannot carry out all that is advised; rats will tolerate less luxury, and it is sure will be compelled to do so in wartime.

Just over two years ago we reviewed a *Handbook of Orthopaedic Surgery*, by Dr. A. R. SHANDS, jun. A second edition has recently appeared (Henry Kimpton, 21s.), and in at least two respects it is superior to the first: the book is shorter by about fifty pages, and the illustrations are very much better—most of them have been redrawn. The text generally has been improved, but the author has not yet learned to confine himself to the fundamentals of his subject—that is to say, that part of orthopaedics which may properly be taught to an undergraduate. The author is still too fond of the rare disease and the unusual operation; he deals with fungus infections of bone (all of which are excessively rare), echinococcus disease (which is probably as uncommon in America as it is here), and he mentions Pellegrini-Stieda's disease. Nearly a page is devoted to leg equalization operations in infantile paralysis, and although it may be a justifiable source of pride to the Americans that the first successful operation in that country was described by Abbott in 1927, this is of little practical importance and of not the slightest interest to the student. Would it not be better to write a handbook of this kind after gauging the essentials of the subject and, still more important, the capacity of the average medical student? There are plenty of fairly complete works of reference available for those who wish to go into the minutiae of this great branch of surgery, but we sadly lack a good introductory treatise.

Preparations and Appliances

PROKAYVIT

Prokayvit (British Drug Houses, Ltd.) is 2-methyl-1:4-naphthaquinone, a synthetic substance chemically related to vitamin K and having all the essential physiological properties of the natural vitamin.

The outstanding facts established regarding vitamin K are that any derangement of fat digestion interferes with the absorption of the vitamin, which is fat-soluble, and its deficiency rapidly causes decrease in prothrombin and a prolongation of clotting time of the blood. It has been proved to be of value in preventing post-operative haemorrhage in obstructive jaundice. Moreover, it has been used successfully in treatment of haemorrhage associated with a variety of conditions in which fat metabolism is deranged—for example, sprue, icterus neonatorum. A wider field of use is indicated by the fact that hypovitaminosis-K is usual in infants, hence the synthetic vitamin may prove of value both in the prevention and treatment of neo-natal haemorrhage.

Prokayvit is a sterile oily solution (5 mg. in 1 c.cm.) intended for intramuscular injection.

EPTOIN ANTI-CONVULSANT

Eptoin (Boots Pure Drug Co.) has the formula sodium 5:5-diphenyl hydantoin. This is the new anti-convulsant, practically free from narcotic effects, which was discovered by Merritt and Putnam in 1937 and recommended by them for the treatment of epilepsy. The drug has received extensive clinical trials (under other proprietary names) and the reports have been very favourable.

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INSULIN RESISTANCE AND SENSITIVITY

By the present generation Sidney Ringer is chiefly remembered as the inventor of the fluid known by his name. Yet we owe him two other debts: at a time when treatment was only cursorily mentioned in textbooks of medicine he produced an admirable work on therapeutics; and he was a leader in the struggle, against strenuous opposition, for the right of Londoners to listen to good orchestral music on Sundays. Since amid all the demands of clinical work Ringer continued his physiological researches it is fitting that Professor H. P. Himsworth should have commemorated him in a lecture based on both laboratory experiment and clinical observation concerning the vexed question of insulin resistance and sensitivity. Apart from a temporary resistance to insulin resulting from intercurrent infections, and apparent resistance due to dietetic irregularities, perhaps concealed from the medical attendant, there remains a group of a more persistent type. Rarely, however, can this attain the level described by H. J. Wiener,[1] in which a Jewish patient aged 58 required 3,250 units of insulin in twenty-four hours to extricate him from coma, and a routine daily dose of 440 units to maintain health.

It has been recognized for some years that alterations in the diet of normal individuals affect the blood-sugar curve, and that in general an increased carbohydrate diet increases tolerance to carbohydrate. This is difficult to reconcile with the idea of carbohydrate excess as an important aetiological factor in diabetes, but is not the point with which Professor Himsworth is concerned. Noting that a low-carbohydrate–high-fat diet renders the subject more resistant to insulin than a high-carbohydrate–low-fat one, he began to wonder whether there may be a type of diabetes due not to lack of insulin but to insensitivity to it. How otherwise are we to account for fatal cases of diabetes in which the islets of Langerhans are found to be normal? He therefore designed a method, of which the details will be found in his lecture, for testing this hypothesis. This enabled him to differentiate between cases in which intravenous insulin promptly suppressed the rise of blood sugar after taking 50 grammes of glucose and those in which it did not. On the whole the members of the former group are younger and thinner and have a normal blood pressure and healthy arteries; their disease has a rapid onset, ketosis is the rule, and insulin easily induces hypoglycaemic reactions. The latter group has precisely opposite characteristics. The abnormality of the insulin–glucose curves is corrected by insulin in the former or insulin-sensitive group, but not at all in the latter or insulin-insensitive. This suggests inefficient rather than deficient insulin action as a cause of such insensitivity, since giving more insulin does not affect the position.[2]

The most characteristic action of insulin is its ability to increase the rate at which the peripheral tissues remove sugar from the blood, a rough idea of which can be obtained by comparing the sugar content in the capillaries with that in the veins after an injection of insulin. The action of insulin in accelerating the rate at which the peripheral tissues remove sugar from the blood is normal in the insulin-sensitive; in the insulin-insensitive it is impaired. In the latter group the condition of the peripheral tissues evidently renders them unable to abstract sugar from the blood at the normal rate, even in the presence of normal pancreatic secretion, so that an overflow into the urine results. This applies mainly to the first hour after insulin; in the long run the total effect of insulin tends to approximate in the two types of cases. Insulin resistance therefore results from retardation of insulin action rather than from its neutralization or destruction. Several observers—R. D. Lawrence, T. H. Oliver, A. Marble, and others—have suggested that this inhibitory action may be, at all events in part, due to the pituitary; now we have some evidence that this is so. Naturally the important work of F. G. Young comes to mind, for he showed that permanent diabetes could be produced in dogs by a course of injections of crude anterior pituitary extracts; but these animals were diabetics of the insulin-sensitive type with changes in the islets of Langerhans. Now if the pituitary be removed from a normal animal the usual changes in insulin-sensitivity which follow variations in dietary carbohydrate do not occur, though they can be imitated by appropriate amounts of pituitary extract. This suggests that the substance which induces resistance to insulin is secreted by the pituitary, and it is noteworthy that the diabetes of Cushing's syndrome and acromegaly is of the insulin-resistant type. Moreover, irradiation of the pituitary region ameliorates the diabetes and increases insulin-sensitivity. Although no trace of an anti-insulin pituitary factor has been found in the blood or urine of ordinary diabetics, whether of the sensitive or usual insensitive type, definite amounts have been found in the urine of a case of acromegaly and two cases of Cushing's syndrome, and, further, this amount was diminished by irradiation. We may therefore state that while the anterior pituitary is responsible for the diabetes associated with hyperpituitarism, its responsibility as a primary factor in ordinary cases of human diabetes at present rests purely on analogy. An important advance has, however, been achieved by distinguishing between diabetes due to deficiency of the pancreatic internal secretion and that due to some mechanism acting peripherally. It is an additional point of great interest to learn that the shifting of the sugar curve in answer to changing diets is at any rate effected through the pituitary, which thus appears to be charged with yet another regulating function. This is presumably related to its power of exciting the liver to convert protein and probably even fat into sugar when carbohydrate intake is restricted.[3]

[1] *Amer. J. med. Sci.*, 1938, **196**, 211.

[2] *Clin. Sci.*, 1939, **4**, 119, 153.

[3] *British Medical Journal*, 1940, **1**, 351.

DISEASE IN CHINA

We who are contemplating the cruelties inflicted by warring European upon European have little heart to consider the similar but more numerous horrors of war in China and none to spend upon the normal ills of humanity in the East. But mankind will survive even this war, and the health of the millions who inhabit China is a matter of importance. Those who attempt to appraise the health conditions of China have all, and more than all, the difficulties which confronted the seventeenth century pioneers John Graunt and William Petty in England. Graunt had no census of the population, and no knowledge of the causes of death outside London. The pioneers in China have no census and medical data for particular areas only. Their medical data are better than Graunt's, but the population is so vast and heterogeneous that their work is more difficult than his.

In 1932 Major P. Granville Edge, a member of the statistical staff, and Dr. H. S. Gear, a postgraduate student of the London School of Hygiene and Tropical Medicine, were invited to go to the Henry Lester Institute of Medical Research in Shanghai to organize a medical statistical survey. The preliminary work was done in collaboration, and after Major Edge's return to England in May, 1933, Dr. Gear carried on the investigation. His report has now been published by the Chinese Medical Association and is a most instructive document.[1] It is based upon almost half a million record cards of patients treated in various hospitals in the two years 1933 and 1934. Unlike the mortality data of John Graunt, these morbidity data were compiled by medical men and women and record age as well as cause of sickness. There is no doubt that they give a faithful picture of the hospital population in the areas sampled. In interpreting them we have to bear in mind (1) the universal characters of a "hospital population," (2) the special characters of this "hospital population." So far as concerns (1) we need not enlarge upon what is common knowledge—namely, that some kinds of disease will be over- and some under-represented in a "hospital population" as compared with the general population. So far as concerns (2) Dr. Gear points out that the hospitals were situated in urban areas and that 85 per cent. of the Chinese population are agriculturists and rural inhabitants. Some of these latter will, of course, come to the hospitals, but the patients will be preponderantly townspeople. Connected with this is the fact that the age distribution of townspeople (determined from sample censuses) contains a very high proportion of young men, and the further fact that the use of hospitals by men is proportionally much greater than by women. These peculiarities go some way to explain the large proportions of venereal disease and violence (burns, gunshot wounds, fractures, contusions, lacerations, dislocations, and accidental poisonings) which figure in the returns. In both years of the survey diseases of the skin and cellular tissue, bones and organs of locomotion, head the list with more than a fifth of the whole number of patients. In both years violence, with about 10 per cent., is second, diseases of the digestive system third, about 8 per cent., and venereal diseases, about 6 per cent., fourth. Tuberculosis with about 5 per cent. is fifth in 1933 and seventh in 1934. These proportions vary from region to region and with the sexes; valuable subtabulations are given.

In general one might say that every disease which takes toll of health and life in this country does the same in China, while some diseases—such as malaria, small-pox, and leprosy—negligibly important here, are serious in China. The section on tuberculosis is particularly interesting. The proportion of respiratory tuberculosis (65.5 per cent. of 9,149 cases) is similar to that reported by Ukil for Calcutta experience and much lower than in the hospital patients of Java (85.5 per cent.). Ukil emphasized lack of common cleanliness and malnutrition as factors; Dr. Gear thinks these apply equally to the Chinese population. We have said enough to indicate the value of this report. It is a grim story; probably the story of to-day is grimmer. Dr. McClure, one of the medical officers co-operating in the survey, wrote: "Our cards this time show a heavy lot of G.C. eyes. This is due to some forty odd cases coming down to us from the 41st Army over in Shansi. The first lot of twenty-six men came over a very rough mountain pass with one man who could see. They each hung on to the overcoat tail of the man in front, and came through very, very dangerous mountain paths. No one fell over, thank fortune. On the plains they walked three abreast, the outside ones touching the shoulders of the man in the centre, who held on in turn to the shoulders of the man in front. The front centre could see and the rest were all blinded. Of twenty-six there were ten odd who were hopelessly blind, and the rest all lost one eye." An Elizabethan poet who had seen service wrote of

> "The broken sleepes, the dreadfull dreames, the woe
> Which wone with warre, and cannot from him goe."

This incident might be a more dreadful dream than Gascoigne ever dreamed, and it happened.

[1] *The First General Epidemiological and Morbidity Survey of China*, by H. Sutherland Gear, M.D., B.Sc., D.P.H., D.T.M. and H. (Pp. 183. 4s.) Chinese Medical Association.

CHEMOTHERAPY IN ENDOCARDITIS LENTA

Some weeks ago[1] we reviewed the position of chemotherapy in the treatment of bacterial endocarditis. The results obtained, while on the whole very disappointing, have been variable: many cases do not respond at all; in others sterility of the blood and an abatement of fever are achieved, though usually without permanent benefit; and very few have apparently recovered. One reason for this variability in effect is brought to light in the observations of R. H. A. Swain, printed in this week's *Journal* at page 722. He compared the action of sulphapyridine and of 4:4′-diaminodiphenyl sulphone on cases of endocarditis due to *Streptococcus viridans* with that of these drugs on the patient's own strains of the organism *in vitro*. In two of the cases reported the treatment was without any effect, and both of the streptococci concerned grew freely in broth containing the drugs. In two other cases the temperature fell and the blood was repeatedly found

[1] *British Medical Journal*, 1940, **1**, 18.

sterile; the streptococci from these patients showed a corresponding *in vitro* susceptibility, growth from any but a very large inoculum being inhibited even by low concentrations of drug in the medium. The term *Streptococcus viridans* covers a heterogeneous collection of bacteria. No two of these four strains were alike in their fermentative reactions, and morphology and colonial appearance can also vary widely. Streptococci of this type are, superficially at least, more miscellaneous than *Str. pyogenes*, and even the latter vary in their susceptibility to sulphonamide compounds, Lancefield's Group D being highly resistant. It is therefore not surprising that among different strains of *Str. viridans* some should be susceptible and others resistant, and clinical experience suggests that the majority are in the second category. The agreement between clinical and *in vitro* effects involves so marked a contrast between these two kinds of behaviour that the validity of conclusions drawn from such cultural tests of bacteriostatic action can scarcely be doubted. This method has been little used, partly because tests of curative action in animals, where they are feasible, are obviously to be preferred, and partly because of a general impression that the direct action of sulphonamide compounds on bacteria *in vitro* is in some essential way different from their action in the body and altogether inferior to it. It has never been really necessary to assume this since the discovery of sulphanilamide; if this substance can inhibit bacterial growth throughout the body to the same extent as it does *in vitro*, this is an adequate explanation of its effect; the task of the normal body defences in disposing of an invader all of whose forces are paralysed becomes easy. In the studies of Fildes and his co-workers,[2] which are of such importance that we shall refer to them in detail on a later occasion, the actual mechanism by which sulphanilamide inhibits bacterial growth has at last been laid bare, and there is every reason for supposing that this mechanism is the same in the body as in the test-tube. *In vitro* bacteriostasis is therefore a valid indication of therapeutic possibilities. The study of this phenomenon, as Swain points out, has a direct application to the individual case of bacterial endocarditis. The performance of such a test with the patient's own streptococcus and the drug which it is proposed to use should indicate whether the treatment is likely to have any good effect. If little or no inhibition of growth is obtained in culture it will almost certainly not be achieved in the patient's blood, and he may at least be spared several unnecessary weeks of the misery produced by heavy doses of sulphonamide compounds. Such a test is all the more needful if chemotherapy is to be combined with so hazardous a measure as continuous heparinization.

COMPENSATION FOR INDUSTRIAL DISEASES

Workmen's compensation in this country is based upon a special statutory liability of an employer to compensate a workman or his dependants for the results of injury by accident arising out of and in the course of his employment. The question soon arose whether compensation could be claimed when a workman caught an illness at work. The scope of the word "accident" was found not to be large enough for the social requirements of the case, and special legislation was passed to make an industrial disease contracted under certain conditions an accident for the purposes of the Act.[3] A schedule to the Act contains a large number of industrial diseases, and fresh ones are added from time to time as they become known. Dr. J. Leclercq, dealing[4] with the position in other countries, says that most industrial nations have legislation for this purpose, but some of it is open to improvement. There are many advocates in this country of the plan, practised by most of the United States and by Germany, of complete indemnity through insurance. Dr. Leclercq points out that the fundamental objection to this method is the uncertainty of diagnosis and of the causal relation between many processes and industrial disease. It is unjustly expensive to industry. That is why most European nations prefer a system which limits the risk and the burden. The French, Belgian, and Italian laws are similar to ours. In Switzerland compensation is covered by a "Caisse Nationale." There is a list of about ninety substances which are considered harmful, but this is not exclusive, and when a malady is clearly due to an occupational condition the Caisse will allow compensation. There is no list of ailments; the practice is to pay compensation for any disease which is an industrial one—a very common-sense attitude. If a disease is not due entirely to the occupation, but partly to some predisposition in the workman, the compensation is reduced in proportion. We take a more beneficial view here, and say that if the work materially contributed to the illness full compensation should be paid. Japan relies on a list of industrial diseases, as we do. Dr. Leclercq lays stress on the great difficulty of establishing a causal relation between the occupation and the illness. This lies at the root of all systems. There is no department of law or social life in which the medical profession plays a more responsible part or has a wider and more urgent field of inquiry.

THE FIELD OF NUTRITION

For the past four years the United States Department of Agriculture has produced yearbooks on a new plan. A series of papers have been written around a central topic with the aim of making the present state of knowledge on the subject accessible to the ordinary man. The first two dealt with "Better Plants and Animals," the third with "Soils and Men"; for the fourth, perhaps in accordance with the greatly increased interest in nutrition all over the world, the theme chosen is "Food and Life."[5] The compilation is extraordinarily successful, and the editors deserve congratulation both on the choice of subjects and on the excellence of their contributors. Approximately two-thirds of the material deals with animal nutrition, as, of course, would be expected in a book emanating from the Department of Agriculture, and this comprises thirty-six papers. Of these, eight have a definite interest for the expert on human nutrition and for the physician, and several among the remainder will be found well worth reading—for example, many will be interested in the article on feeding dogs. The medical reader will be more concerned with the section on human nutrition. It starts with an admirable summary of the whole field by Dr. Gove Hambidge which presents the facts succinctly (a rare quality) and readably. Despite the large number of "popular" books on nutrition, this summary would be worth separate publication, for it would then reach and profit many who would be discouraged by the size of the yearbook. The next twenty-one chapters, by acknowledged experts, deal with a variety of themes. Space does not permit of detailed reference to them all, but they

[2] *Brit. J. exp. Path.*, 1940, **21**, 67, 74, 90.
[3] Workmen's Compensation Act, 1925, ss. 43, 44.
[4] *Arch. Méd. soc. Hyg.*, 1939, **2**, 676.
[5] *Food and Life*. United States Department of Agriculture Year Book, 1939. Superintendent of Documents, Washington, D.C. ($1.50.)

range from "Food Functions and the Relation of Food to Health" and the "Vitamin Needs of Man" to "The White Rat as a Contributor to Science." While, as has been said, the intention of the volume is to make a general appeal, those not versed in modern science will find such articles as those on mineral and protein requirements a little difficult, but they will meet fewer obstacles in the chapters which apply such information to the needs of the individual. These too can be read with real profit by the physician, who will find them mines of information, though unfortunately some of the material is not readily applicable in this country owing to the differences in foods and food habits. At the end of the book is a bibliography of 1,278 references.

PROBLEMS OF LIGHTING

Problems of lighting in relation to visual comfort and ability have become of major importance since the black-out. The loss of satisfactory illumination which is now being experienced has vividly recalled problems that had become meaningless to all but the older ophthalmologist. In a paper read before the Medical Officers of Schools Association early last year Mr. Bishop Harman[1] gave a heartening account of difficulties overcome that were prevalent at the beginning of the century. Artificial illumination was then distinctly limited; ten foot-candles was regarded as impracticable, whereas to-day five times that illumination is easy, safe, and relatively cheap. The dimly lit classrooms of the past undoubtedly induced a sense of fatigue which made consistent work difficult, but the earlier ophthalmologists, Hermann Cohn and his school in particular, were led to advocating better lighting for reasons that went beyond this question of fatigue. They believed that working in poor light could produce structural changes in the eye, and it was their attempts at controlling myopia that drove them to being pioneers in school hygiene. Although their work has not been very productive in this particular direction it has led to the airy, well-lit classrooms of to-day, where the problem of lighting is totally different from that which they had to face. For the problem to-day is not how to obtain sufficient illumination but how to distribute it so that the glare from excess shall be avoided. The eye is, of course, a remarkable self-adapting instrument. In bright sunlight there is illumination of about 10,000 foot-candles; on a cloudy day or in the shade of a tree the illumination drops to 1,000 to 2,000 foot-candles. The eye can adapt itself to illumination of this order and also to such low illumination as the two to three foot-candles in the average home by the process of light-adaptation and by changes in the size of the pupil. Yet, relatively small intensities of illumination may produce glare with consequent ocular discomfort if the light is ill distributed or reflected, say, by the sea or by pavements. The conditions prevailing at the beginning of the century to which Mr. Harman referred are now of historical interest only—a state of affairs due in no small measure to his own persistent work. These conditions carry, however, a lesson for the present. In recent months many of us have learned for the first time that poor illumination can indeed be trying. Reading in ill-lit trains became an impossibility. The temporary blinding of a dark-adapted eye by light is another experience which has emphasized the need for planning the illumination that lightens our darkness. The labours of the previous generation have left us with clear indications that a minimum of light is a necessity and that that minimum has to be used not haphazardly.

[1] *J. social Ophthal.*, 1939, **2**, 99.

SULPHONAMIDE COMPOUNDS AND MALARIA

Workers in tropical medicine have not been slow to make extensive trials of sulphonamide compounds in the treatment of malaria, and reports are now accumulating of the results so far achieved. Africa, Dy, and Soriano[1] have recently recorded a favourable anti-plasmodial action of prontosil in birds affected with *P. praecox*, which, they state, is contrary to the opinion of Coggeshall,[2] who reported that sulphonamide compounds were found to have no prophylactic or therapeutic effect on avian malaria. Similarly, discordant views have been expressed about these drugs in other forms of malaria, but, as is not surprising, the favourable reports preponderate. Van der Wielen,[3] de Leon,[4] Hill and Goodwin,[5] Pakenham-Walsh and Rennie,[6] Gonzales Barreras,[7] Motzfeldt,[8] Chopra and Das Gupta,[9] and Chopra, Hayter, and Sen,[10] using one or other derivative, found some therapeutic action in human malaria of various types, and Sinton[11] states that experimental infections with *P. falciparum* were prevented in some cases by proseptasine. Chopra and Das Gupta,[12] Rodhain,[13] and Coggeshall[2] also obtained good results with various sulphonamide derivatives in the treatment of simian malaria. Nevertheless, Faget, Palmer, and Sherwood[14] state that "sulphanilamide and prontosil possess no practical chemotherapeutic value in malaria," a conclusion supported by the experiments of Read and Pino[15] and of Sinton.[11] There seems little doubt that the sulphonamide compounds are capable of exerting some influence upon certain strains and stages of malaria parasites, as are several other drugs of widely differing constitutions. It seems equally clear, however, that, with the possible exception of certain organic arsenicals against *P. vivax*, no drug has so far been found suitable to displace either quinine or atebrin in the practical treatment of malaria in man.

ERYTHROCYTE SEDIMENTATION RATE

The value of the erythrocyte sedimentation rate in diagnosing many forms of rheumatism and in studying the progress of the disease and the effect of treatment in both rheumatism and tuberculosis is now generally recognized, though it is doubtful if the test is as widely used as it deserves. In some interesting papers on the test which have recently been published[16] a group of pathologists from the spa hospitals of Bath, Buxton, Droitwich, and Harrogate, where the test is in daily use and thousands of observations are made in a year, describe a technique they have devised which makes a correction for anaemia. This is important because a reduction in the normal red cell content causes a more rapid rate of sedimentation as a general rule. The degree of anaemia can be roughly estimated at the same time

[1] *Acta med. Philippina*, 1939, **1**, 19.
[2] *Proc. Soc. exp. Biol., N.Y.*, 1938, **38**, 768.
[3] *Nederl. Tijdschr. Geneesk.*, 1937, **81**, 2905.
[4] *Publ. Hlth. Rep.*, Wash., 1937, **52**, 1460.
[5] *Sth. med. J.*, Nashville, 1937, **30**, 1170.
[6] *Lancet*, 1938, **2**, 79.
[7] *Rev. Med. Cirug. Habana*, 1938, **43**, 260.
[8] *Norsk. Mag. Laegevidensk.*, 1938, **99**, 872.
[9] *Indian med. Gaz.*, 1939, **74**, 201.
[10] Ibid., 658.
[11] *Trans. roy. Soc. trop. Med. Hyg.*, 1939, **33**, 160.
[12] *Indian med. Gaz.*, 1938, **73**, 395.
[13] *Ann. Soc. belge Méd. trop.*, 1938, **18**, 255.
[14] *Publ. Hlth. Rep.*, Wash., 1938, **53**, 1364.
[15] *Arch. Schiffs- u. Tropen-hyg.*, 1938, **42**, 132.
[16] *Annals of the Rheumatic Diseases*, 1939, **1**, 333, 359.

as the sedimentation test is performed, and at every successive examination to determine the patient's progress under such treatment as chrysotherapy, when the appearance of anaemia is a danger signal, any variation in the number of red cells as indicated by the measurement of the "packed cell volume" can be detected. Other important features affecting the white cell count and the plasma may also be noted during the observations. This paper deserves careful study by all who are interested in the subject. In the same journal Goldie discusses whether the sedimentation test can give warning of any ill effects of gold therapy. The observations were made on a large number of patients and the tables submitted to a statistician. The result, however, shows that the test fails to give any warning beyond what may perhaps be inferred from a reduced red cell count. Cutbill, also in the same journal, describes a method he has devised, and which is in use at the Cheshire Joint Sanatorium, whereby the result of examinations made over a period of five hours can be expressed by a single figure. This is based on mathematical considerations which can be very simply carried out, although at first they appear formidable. Where such a long period of observation is thought desirable, as in tuberculosis, the method presents many advantages, and might possibly be capable of modification to bring into line the readings made by different methods.

GENERAL MEDICAL COUNCIL FINANCE

The 2,000-odd persons whose names are added to the *Medical Register* every year may sometimes wonder what is done with their registration fees. These fees, which are paid to the English, Scottish, or Irish Branch Councils, are the principal source of income of those bodies, and enabled them to contribute last year a sum of £5,311 towards the expenses of the General Medical Council itself. The number of £5 registration fees paid to the English Branch Council was 1,435, to the Scottish 692, and to the Irish 362, while 483 £5 registration fees in respect of colonial and foreign medical qualifications were paid to the General Council directly. There was a time, forty years ago, when the Council was living on its capital and was drifting towards insolvency. The year 1906 was the first for a long period in which it showed a surplus of income over expenditure. Nowadays the finances are in a thoroughly healthy condition, the General and Branch Councils all having large assets and surpluses. The minutes of the recent meeting of the Executive Committee of the Council, which consist principally of the financial statement for 1939, have some points of interest. The factor which has diminished the Council's expenses is the lessened amount of delinquency in the profession, or at all events the lack of cases requiring very lengthy hearings, coupled with a more expeditious method of dealing with disciplinary inquiries. In years gone by the Council was accustomed to sit on about fourteen days in the year. Recent sessions have been much shorter; last year the winter session occupied only two days, and the summer session only three. This reflects itself in the fees and expenses of members, which are £700 down on the year. The printing of the *Medical Register* cost some £1,500, two-thirds of which is returned in sales. Other items of expenditure included £300 on air raid precautions, £800 on minutes and programmes, and £200 on shorthand reports of penal cases and other expenses of meetings. The correction of *Registers* entailed an expenditure of £433, and law costs were just over £500. One item which will not recur this year is for election expenses, £177. By Order in Council the election of direct representatives has been postponed, and if a vacancy occurs in the direct representation it will be filled by the Council itself. The cost of the *British Pharmacopoeia* in 1939 was £2,883, the principal item being the salaries of officers of the British Pharmacopoeia Commission; sales of the volume, which is dated 1932, and of the Addendum, dated 1936, brought in just upon £1,500.

THE HOSPITAL ALMONER

The hospital almoner made her debut as a sort of accountant or rate-collector, her function being to see that their proper dues were paid by hospital patients who were able to pay them. But her office quickly developed into personal service of an invaluable kind, until now, without her help, the re-establishment in health of the discharged patient would be much more difficult and less certain. Her acquaintance with the economic difficulties of patients, which have a close bearing on their ultimate recovery, her knowledge of the health services available to them after leaving the hospital, her acquaintance with recent, and especially emergency, legislation in its possible bearing on the patient's position, all make her an indispensable member of the staff of any large hospital. We are glad to note the remark of Miss Florence Horsbrugh, Parliamentary Secretary to the Ministry of Health, in addressing a meeting of hospital almoners the other day, that the services of the trained almoner are likely to have an even wider appreciation after the war. She added that the Ministry of Health has recently sent a circular advising those hospitals which have been transferred to public health purposes under the Local Government Act, 1929, to make use of trained almoners. At present, in voluntary hospitals at all events, a much larger number of uncertificated than of certificated almoners are employed. Of the voluntary hospitals of London, according to the most recent edition of *The Hospitals Year Book*, thirty-five employ a certificated almoner or almoners, and sixty-five rely on uncertificated persons; in the provincial voluntary hospitals the respective figures are fifty-nine and 123. No doubt many of the uncertificated almoners are undergoing training and gaining experience, but this work has come to demand not only devotion—which both certificated and uncertificated possess—but also expert knowledge and technique, and it seems very desirable that all hospitals, so far as possible, should insist on a standard qualification. An organization, the Institute of Hospital Almoners, exists to choose and train suitable candidates for this work, to grant certificates, to keep a registry, and to extend and develop the almoner system in the hospitals of the country.

In our advertisement pages this week will be found particulars of an intensive course in War Medicine arranged by the British Postgraduate Medical School, Ducane Road, London, W.12. It will be held daily from 10 a.m. to 4 p.m. from Monday, May 27, to Friday, May 31, inclusive. The fee for the course is one guinea, but no fee will be charged to officers of the armed forces who submit a leave certificate and register their names beforehand.

Dr. George Graham will deliver the Croonian Lectures on "A Survey of the Recent Work on Diabetes Mellitus" before the Royal College of Physicians of London, Pall Mall East, S.W., on Thursday and Tuesday, May 16 and 21, at 2.30 p.m.

PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

RINGWORM OF THE FOOT

BY

HENRY MacCORMAC, C.B.E., M.D., F.R.C.P.

The dermatologist's chief concern with infections of the foot is in regard to those attributable to ringworm. This, it might be thought, should represent a relatively simple problem in diagnosis and treatment, the invasion of the skin by a specific organism causing a characteristic and recognizable local reaction. We need only examine a portion of the extensive literature to perceive how devoid of this apparent simplicity the subject has become. As there can be few practitioners who do not number among their patients one or more victims of this prevalent scourge a knowledge of the clinical picture and of the methods of prevention and treatment is of great importance.

Although often looked upon as a recent problem, this is far from the truth, for so long ago as 1892 Djelaleddin-Moukhtar clearly described the condition and its parasitic nature in a communication to the French Dermatological Society. His pioneer work, and indeed his just claim to priority of discovery, were generally overlooked, and it was not until some few years before the war of 1914–18 that the significance and importance of the characteristic lesion between the toes began to be appreciated. I well remember, when as a bacteriologist I assisted the late Dr. J. J. Pringle, hearing him say that foot ringworm first appeared in London after the South African War, and, further, that both it and tinea cruris were remarkably uncommon in women. The relative freedom of women from infections of this kind is perhaps worthy of comment, and in this connexion some observations collected by W. N. Goldsmith may be recorded here. Thus in the University of California in 1928, 51.5 per cent. of the new men students and 15.3 per cent. of the new women students had clinical evidence of foot ringworm (Legge, Bonar, and Templeton). After one term with attendance at the gymnasium the percentage in the men increased to 78.6, but in women only by 2. Similar figures are given for other American universities, showing that this difference between men and women was not attributable to local conditions or modes of dress. So much for Dr. Goldsmith's collected records. To these I would add a personal observation. While outbreaks of tinea cruris are embarrassingly common in boys' schools I have never heard of or come across a similar epidemic in establishments for girls. This may be mere chance, and the above statements may be criticized and corrected by others with a contrary experience. Although unconnected with the present problem there is evidence from another direction that the soil profoundly influences the growth of the ringworm fungus—in the spontaneous cure of ringworm of the scalp at or about puberty, and in the complementary phenomenon of the immunity from ringworm infection of the hair on the adult head.

From what has been said it will be appreciated that ringworm infection of the foot is now a widely distributed complaint: it has something in the nature of a social qualification, beingly commonly met with among the upper and middle classes, but only rarely in hospital patients. This is, however, not a question of a predisposed soil as in the sex distribution, but rather an effect of the habit of taking baths, the bathroom floor providing a common medium for spread of the disease. It may thus be said paradoxically that foot ringworm is a penalty of cleanliness.

Of the very many varieties of ringworm fungus, amounting to more than forty species, only two are now accepted as the responsible agents for the disease as it affects the foot. This is a simplification of the former mycology, and is justified on the grounds that previous investigators had sometimes independently described the same parasites under different names. The two varieties responsible are *Epidermophyton inguinale* and *Trichophyton pedis*, the latter being probably identical with the better-known *Trichophyton gypseum*. Besides being distinguished by their different cultural characteristics these two varieties differ somewhat—in theory at least, and probably to a large extent in practice—in their clinical reactions. Thus *Epidermophyton inguinale* is held to produce the white patches between the toes and *Trichophyton pedis* the vesicular lesions. Of greater importance, because of its effect on prognosis and treatment, is the affinity of the *Trichophyton pedis* for the nail substance, and, in contrast, in theory at least, the opposite quality of epidermophyton. In its simplest form ringworm of the foot is characterized by a patch of thickened white skin between the little and next toe, sometimes accompanied by a painful fissure. In more pronounced degrees the sodden epidermis accumulates in similar fashion within the other interdigital spaces; and a further stage is marked by exfoliation, with some degree of redness of the skin at the base of the toes. On the instep and sole exfoliating and vesicular patches add to the complexity of the clinical picture, the different phases and degrees being governed by the variety of organism and the reaction of the patient. A remarkable feature observed in some cases is the unilateral distribution, only one foot becoming infected. Asymmetry such as this, especially when of long standing, is not easy to explain, because the interchange of socks from foot to foot should easily and constantly carry infection from one side to the other. Finally, in a considerable proportion of cases the nails are secondarily infected, becoming in consequence brittle, opaque, and deformed.

Diagnosis

This may rely entirely on the objective characters of the eruption or on laboratory methods, or on both. Diagnosis which only takes into account the appearances of the lesions is open to some degree of error because there are various non-parasitic conditions that closely mimic ringworm. In cases of suspected but unconfirmed ringworm the application of a fungicide becomes both a method of treatment and a therapeutic test. Fungicides have necessarily a high concentration of active principles: as such they exercise a beneficial action on an infection but an injurious action on non-parasitic lesions, such as eczema or dysidrosis. It is thus important to take note of the form of the reaction and to avoid the continued imposition on the affected skin of a remedy against which it has clearly declared its resentment. The observer will, however, usually endeavour to confirm the clinical diagnosis by direct microscopical examination. For this purpose a small curette is used, material being taken preferably from the more active part, or margin, of the eruption. To reach the skin containing the fungus fairly

vigorous use of the instrument is required. The superficial tissue so gathered is spread on a slide, soaked in liquor potassae, covered with a slip, and gently heated to accelerate the clearing of the specimen. If mycelium is present the observer may be so fortunate as to discover it at once, but it is more often necessary to go over the whole specimen methodically, and some time may be spent before the fungus is found. It should be pointed out that the presence of mycelium in the scrapings so examined is not unequivocal proof of a ringworm infection: the mycelium may represent one of the common skin monilias which are present in both damaged and healthy skin, especially in regions where heat and moisture favour their growth. Thus the final and complete proof may rest upon the cultivation of the specific organism on laboratory media, a procedure requiring special technical knowledge and the resources of a pathological laboratory. Research of this kind can only be required in special cases and circumstances. The practitioner will as a rule be content to rely upon the local signs, confirming the diagnosis, so far as this can be done, by direct microscopical examination of material removed with the curette from the affected regions.

Differential Diagnosis

At least three conditions have to be considered under this heading. The first, acrodermatitis perstans, bears a very close resemblance to the ordinary conception of palmar or plantar ringworm. Although often classified among the rarer skin diseases acrodermatitis perstans is by no means very uncommon, and thus may be met with from time to time in general practice. Its characteristic features are briefly summarized as follows. The eruption is confined as a rule to the palms and soles, showing a preference for the palmar and plantar margins, and the instep. One or all of the extremities may be affected, and the eruption, although free from any contagious quality, may spread from one region to another. The patches of affected skin are red, with some degree of scaling, often with a well-marked peripheral scale: within the patch are numerous little pustules, or lesions resembling pustules, the contents of which in their early stages are invariably completely sterile. A mild chronic form of acrodermatitis perstans, with vesicular and pustular elements only, has been described by S. E. Dore. The remarkably persistent and rebellious qualities of the eruption distinguish it from dysidrosis, while the absence of fungus on direct examination or on culture excludes ringworm. In doubtful cases the therapeutic test, as mentioned above, can be of considerable service. The chronicity of the eruption and its irregular course, characterized by the development of fresh patches in new regions while others in the original positions are clearing up, suggest an endogenous factor (acrodermatitis perstans) rather than a local infection (ringworm).

The second condition to be considered in the differential diagnosis is eczema, and in this connexion it is significant that in many of the earlier descriptions of foot ringworm the qualifying term "eczematoid" has been used. Of the eczema reaction nothing special need be said: it is of such a kind as comes within the ordinary clinical conception of this state—a red, swollen, weeping surface either confined to the toes or extending backward over the foot. The accompanying white sodden skin between the toes seems to disclose the causal ringworm infections, and such an eruption may in fact be a true eczematoid ringworm. This should not at once be assumed, for all these objective characters may represent an idiopathic eczema—that is, one in which the ringworm fungus plays no part either as a causal or as a contributory factor. Nor should it be forgotten that a moist skin of this kind invites the company of one of the common skin monilias, the mycelium of which may on microscopical investigation be found in the interdigital skin, leading to some confusion because of its resemblance to ringworm. These several conditions, although they share a common reaction, call for very different, and indeed antagonistic, kinds of treatment; prudence will therefore demand a cautious approach, using, at first at least, simple rather than severe remedies.

MONILIASIS

Moniliasis, to be considered last in the differential diagnosis, perhaps merits a separate place on the ground that it is an independent infection. It is taken here as a matter of convenience. Although Langenbeck discovered the parasite of thrush as long ago as 1839—without, it may be added, appreciating its significance—it is only within comparatively recent times that dermatologists have sought to attribute certain dermatoses to pathogenic monilias. While several varieties of the fungus have been described, a differentiation into types has not the same practical importance as in ringworm, because there is no specific connexion between the nature of the lesion and the variety of the fungus. Thus in the foot diverse monilias are met with both in the vesicular eruption and in the patches of interdigital white skin indistinguishable from ringworm. And, as it may be supposed, in such cases a false diagnosis of ringworm has often been made on clinical grounds and seemingly confirmed by finding mycelium in skin taken for direct microscopical inspection. Monilia is present on the skin of every individual, and in the absence of any abnormal condition can be cultivated from beneath the nail folds and from regions such as the groins, axillae, and scalp. The pathogenicity of the fungus is of a low order, and it would seem to require a special soil—for example, a moist seborrhoeic skin—for its profuse development. It is thus found in seborrhoeic and other eruptions, and it is then not easy to decide how far it is directly causal and how far merely a contributory factor. It is therefore evident that, short of the evidence of a culture made on laboratory media, the differentiation between moniliasis and ringworm may be very difficult.

Side-effects

Mycotic infections of the foot may remain strictly localized or they may induce distant reactions, either by the direct spread of the infection or indirectly by dissemination of the fungus or some derivative of the fungus through the blood stream, inducing a distant allergic eruption in a sensitized skin. Direct infection from the foot to the groins, axillae, and, in women, to the submammary regions is not uncommon, and thus an unsuspected and unrecognized foot ringworm may account for repeated attacks of tinea cruris in an individual or even an epidemic in a school or institution. In all these cases inspection of the feet should form a part of the ordinary routine. The indirect or allergic reactions have an academic as well as a practical interest. It has long been known, indeed since Jadassohn first described the lichenoid trichophytid more than twenty years ago, that an inflammatory ringworm might be followed by a generalized (allergic) eruption. Recently it has been sought to explain certain eczemas on the basis of a similar allergic mechanism: thus it is held that a proportion at least of the dysidrotic eruptions occurring on the hands are epidermophytid—that is, an allergic eczema secondary to epidermophyton infection of the foot. Every form of dysidrosis cannot be explained in this way, because

an associated ringworm of the foot is often wanting. The critical test should rely upon the disappearance of the hand eruption when the foot infection is cured, a result by no means always met with. There is also described a dysidrotic moniliid of the hands considered to be similarly related to a moniliasis of the foot. In both these cases theory has possibly outmarched its legitimate bounds and some of these supposed allergic reactions may perhaps be attributed as much to wishful thinking as to an exact pathology.

Treatment

The treatment of ringworm and allied infections should take into consideration the destruction of the fungus with a suitable fungicide and the prevention of reinfection from socks, stockings, and even shoes and floors. Of the various fungicides Whitfield's ointment still takes pride of place. A useful modification consists of benzoic acid, 15 grains; salicylic acid, 15 grains; petroleum jelly, 1 oz. This can be applied to the foot at night and is usually well tolerated. It may also be applied to ringworm of the groin and axillae. Where a desiccating effect is sought—for example, in the treatment of the interdigital infections with accumulations of sodden white skin—the same amounts of the above ingredients are dissolved in an ounce of spirit and the solution is used as a paint. In this form the remedy is more active and more severe. Castellani's fuchsin paint is an alternative treatment, and may be substituted for the above ointment or solution. The thickened white skin which protects the buried fungus from the action of the fungicide has been referred to. Mechanical removal of this skin may be attempted, or a barium sulphide depilatory preparation may even be required. As a measure against reinfection the patient should wear cotton toe-caps, which must be boiled. The patient should also have a rubber bath-mat for exclusive personal use, so as to avoid infecting others.

Eczema Reactions

Mention has been made of the eczema reactions which are superimposed upon a foot ringworm or are mistaken for that condition. Where such reaction is present preliminary treatment is called for on the following lines. The toes are separated by strips of gauze, and the foot is covered with gauze, kept constantly wet with the following: glycerin of subacetate of lead, 1 oz.; glycerin, 1 oz.; water to a pint. This lotion can be replaced at a later stage by Lassar's paste, to which liquor picis carbonis 20 to 40 minims to the ounce may be added. Sometimes the following paste is found useful as a drying and decongesting application: glycerin of subacetate of lead, 2 drachms; glycerin, 2 drachms; powdered starch and powdered zinc oxide, 1 drachm of each.

The swollen toes and foot may also represent an eczema complicated by a staphylococcal infection, possibly superimposed on interdigital ringworm. In these cases good results are obtained with dressings of acriflavine solution in water, 1 in 20,000. When the pronounced effects of the eczema phase have been brought under control and the skin has settled down to a stage when it will tolerate such things, then, if any actual ringworm infection is revealed, treatment with a fungicide can be begun. On these lines most such foot infections, and their companion processes, can be cleared up, but there will always remain a considerable proportion which continue to provide a problem not easily solved. In some of these cases the rebellious quality may result from infections of the toe-nails, which constantly reinfect the skin.

MEDICAL BENEVOLENCE IN WARTIME

Sir Thomas Barlow presided at the annual meeting of the Royal Medical Benevolent Fund, which took place at the house of the Royal Society of Medicine on April 22. The treasurer, Dr. Lewis G. Glover, said that the financial position of the Fund, notwithstanding war strain, was not altogether unsatisfactory. The subscriptions and donations for last year, which amounted to £13,192, were lower by £440 than the year before, and the allocation of £1,237 from the Charities Committee of the British Medical Association was down by £296. It had been the practice of the Fund to invest all legacies so as to have a capital sum the interest from which would ensure the annuities which the Fund provides, but this arrangement has been temporarily suspended. Legacies received during 1939 before the outbreak of war, amounting to £3,491, have been passed to capital as usual, but those accruing during the last four months of the year, amounting to £2,255, have been kept in liquid form as an emergency reserve to supplement diminishing subscriptions. On the other side of the account the administration expenses are down by £129, and expenditure on appeals and publicity by £54. The excess of expenditure over income is only £548. The value of the Fund's investments at the end of the year was £225,377.

Sir Thomas Barlow mentioned appreciatively the work of the Ladies' Guild, which does much to augment the Fund, and also testified his gratitude for the response to his Christmas appeal, which, although made in wartime to a profession very largely scattered, and with many uncertain of their future, brought in £1,061, or practically the same as the year before. He took the Christmas offering to the Fund as an expression of confidence in its administration. Mr. Handfield-Jones, the honorary secretary, described the evacuation of the Society's offices from its long-familiar haunts in Chandos Street, Cavendish Square (the termination of the lease of which coincided, rather fortunately, with the dispersal), and the carrying on of the secretary's work in a cottage in Essex. The staff and records, however, have now been reassembled on the outskirts of London, at Putney, where they will probably remain for the duration of the war. He spoke in terms of high praise of the members of the staff, who had carried on under difficult conditions without the neglect or overlooking of any item of the Fund's work.

A vote of thanks was accorded for various assistance to the Fund rendered by the British Medical Association and its Charities Committee, the Medical Insurance Agency, and the medical and lay press. The officers and committee of management were re-elected, and two ladies—Miss Elizabeth Bolton and Dame Janet Campbell—were added to the vice-presidents.

Speaking at the annual meeting of the Central Council for the Care of Cripples, Dame Georgiana Buller said that the clinical treatment of cripples had made enormous strides during the past twenty-five years, but this was only half of the problem. There remained the problem of the permanently disabled. Remedial work helped the injured person to the maximum restoration of function in the shortest possible time and also to recovery of the habit of work. In many cases results could be achieved much more quickly by manual occupation suited to the particular disability than by massage and physical therapy alone. Remedial work as part of rehabilitation was quite distinct from vocational training, but the two phases were so closely interdependent that they could not be entirely separated without detriment to both. The results of short-term training for many different types of employment had shown that even very seriously disabled men could hold jobs on equal terms with the able-bodied. A small number of cripples would always need sheltered conditions of work, with perhaps a certain amount of medical supervision. The rehabilitation centre, said Dame Georgiana, should include, in addition to the occupational therapy or remedial department, the vocational training department, and sheltered workshops, hostels for residents, recreation facilities, a medical block, a workshop for repairing and adapting surgical appliances, and an advice bureau.

Reports of Societies

PREVENTION AND TREATMENT OF TETANUS

At a recent meeting of a medical society of a sub-area of the British Expeditionary Force, with the president, Colonel F. WHALLEY, in the chair, Lieutenant-Colonel L. B. COLE read a paper on tetanus.

The disease, he said, could now be prevented by either passive or active immunization. Passive immunization was obtained by injecting a prophylactic dose of antitoxin as soon as possible after the wound, and active immunization by two injections of formol-toxoid given some time before going on active service. In passive immunization toxin was probably neutralized as it was absorbed from the wound, but the effects only lasted for a few weeks. Active immunization probably acted in two ways: (1) by stimulating the body cells to produce antitoxin; and (2) by sensitizing the body cells to react by forming more antitoxin when further toxin or toxoid was introduced. The value of passive immunization was clearly shown in the last war by the great reduction in both incidence and case mortality after it had been introduced. The few who developed the disease after a prophylactic injection usually had a prolonged incubation period with a slow onset and recovered. The disadvantages were that the injection had to be given soon after a wound had been received; in some cases it had to be repeated, the immunity conferred only lasted a few weeks, and repeated injections were liable to give rise to serum reactions. In 1927 a method of producing active immunization by injections of formalized toxin was introduced by Ramon and Zoeller, and experiments since then had shown that this was successful in raising the antitoxin titre to a level which afforded protection. The advantages of the active over the passive method were that the former could be given before a soldier went on active service, and that immunization probably lasted many years and might be permanent. The only disadvantage was that slight allergic reactions had followed the injection of toxoid on rare occasions. This had been attributed to the small amount of peptone present. It was important to remember that active immunization had not yet been tested in warfare on a large scale, and it was perhaps because of this that both methods were now in use in the British Army for every man. At present it might be difficult in the case of a wounded man to know definitely whether both doses of toxoid had been given. So long as there was any doubt about this it was as important to give a prophylactic injection of antitoxin as it was in the days before active immunization had come into use. To use both methods might be to fall between two stools, unless both were given with proper care.

After deep infected wounds, which were likely to produce large amounts of toxin, it was important to repeat the prophylactic injection on the second day and again on the seventh, and in some cases again later. He had seen a patient who had received a prophylactic injection of 2,000 units immediately after a crushed finger. Tetanus developed ten days later, and, in spite of immediate treatment, was fatal in four days.

Colonel Cole said that in fifty cases he had seen and treated in civil practice the wound had usually been slight. This was because patients with severe wounds were always seen by a doctor, who gave prophylactic antitoxin. In slight wounds no antitoxin was given either because a doctor was not consulted or the wound was considered too slight to need it. He had seen nine cases following dirty abrasions with scabs and nine following whitlows. The patients were almost always people who did not keep their hands and feet clean.

Early Diagnosis

Early diagnosis was important, so that there should be as little delay as possible in giving serum, but this did not seem to be sufficiently realized. When a wound was infected, toxin was absorbed gradually and the first symptoms usually appeared before a lethal dose had been fixed by the nervous system. It was important that a large dose of antitoxin should be given at once to stop further absorption and neutralize any toxin still circulating in the blood and lymph. Trismus, or less commonly dysphagia with pain in the back and neck, was the usual early symptom. On examination at an early stage there was usually slight arching of the back, so that on a flat bed the flat of the hand could be passed under the spine in the lumbar region without touching the patient. If the patient was then told to press his back down on to the examining hand he could not do it and the arching often increased. Board-like abdominal rigidity, usually without much tenderness, was also an early sign. Manipulation of the arms and legs in the early stages would often bring on increased rigidity and arching of the back. The occurrence of cranial nerve palsies following wounds of the head should raise the suspicion of cephalic tetanus.

Treatment with Antitoxin

In treatment the first consideration was to give a large dose of antitoxin intravenously as soon as possible. He had chosen a dose of 200,000 units as being large enough to neutralize all unfixed toxin and prevent further absorption. After four cases so treated Spooner showed that antitoxin disappeared gradually, leaving about 50,000 units still present after seven days and 5,000 after fourteen days. Antitoxin should preferably be given intravenously, but, if not, intramuscularly. If there was difficulty about giving the whole dose when the case was first seen, a smaller dose should be given and the rest as soon as possible. Antitoxin should never be given intrathecally, and lumbar puncture should be avoided because it was unnecessary and tended to excite spasms. When this dose had been given there was no advantage in repeating it except in the case of severe infected wounds, when an additional 50,000 units might be given intramuscularly once a week. No surgical treatment of the wound should be carried out for at least one hour after administering antitoxin. Additional antitoxin should always be given before operation or manipulation of an old infected wound.

Control of Reflex Spasms

Spasms were of two kinds: (1) tonic rigidity, which chiefly involved the masseters and the muscles of the spine, chest, and abdomen; (2) reflex convulsions, chiefly affecting the same groups and occurring at regular intervals or in response to sensory stimuli. The first was in itself harmless, was the first to appear and the last to go. The second were superimposed on the first and were dangerous because they exhausted the patient and stopped respiration. It was most important that these should be controlled. For this purpose avertin given per rectum as for basal anaesthesia was the drug of choice. In severe cases this would usually stop the reflex convulsions for from four to six hours, after which it had to be repeated. In some cases two or three such doses a day for eight or more days might be necessary. Continuous warmed nasal oxygen should be given with avertin to prevent cyanosis and lessen the danger of pneumonia, and atropine grain 1/100 to 1/200 to keep the air passages dry. As an alternative to avertin, rectal paraldehyde in basal anaesthetic doses might be used with the same precautions. Some idea as to how severe the reflex spasms were likely to be and of the prognosis could be gained by noting how soon after the onset of trismus the reflex convulsions appeared. If they came within forty-eight hours they were likely to be very severe and the prognosis was very bad, while the longer they were delayed the better the outlook. When no reflex spasms appeared the prognosis was very good. In fatal cases treated on the above lines death usually occurred within seven days. In nineteen fatal cases he had observed death took place within five days in sixteen, and in three in which it was delayed there was intercurrent disease.

Good management and nursing were very important. Anything likely to excite reflex convulsions, such as noise, light, or vibration, must be carefully avoided. All essential manipulation and movement of the patient should be done when he was most deeply under basal anaesthesia. It was important to maintain strength by giving plenty of nourishing fluids, and for this a stomach tube was sometimes necessary. In severe cases avertin made feeding much easier.

Correspondence

What is Influenza?

SIR,—While in no way decrying the work of the Medical Research Council, who, indeed, in their latest report are most careful to admit that infection with the virus of epidemic influenza did not constitute a clinically recognizable entity, at least in 1939, I feel that perhaps the statement should be reversed and it be stated that the clinical entity generally recognized as influenza has not yet been shown to be due to any one organism or virus.

The present seasonal epidemic infection presents another problem. In 95 per cent. of my own cases the symptoms in no way resemble those usually associated with 'flu. There was very rarely an acute onset with shivering, rarely the sudden weakness, in few, if any, the generalized aching; few had coryza, and in most the symptoms were those described by other contributors—namely, tonsillitis, pharyngitis, laryngitis, and tracheitis, the latter being extremely acute and perhaps the most typical symptom of this year's epidemic. "Barbed wire" and "rusty nails" were two common descriptions of the condition. Fever was common but not prolonged, except in cases with some basal congestion. No real pneumonia was met with in a series of about one hundred cases. Surely this epidemic should not be described as influenza? It is suggested, as stated in your leader of April 27 (p. 694), that there was evidence in 1939 of two distinct epidemics clinically inseparable. While this may be so, is it not more reasonable to suggest that the epidemics were one and the same and that as yet the one and true cause has not been discovered?

Even if the basic cause is the influenza virus and the bizarre manifestations due to secondary invaders, one should expect the basic cause to give evidence of its presence by some symptoms resembling influenza as generally described. Unofficially one hears that this year's epidemic infection, whatever it may be called, has not given positive results for the presence of influenza virus, and one would have been surprised if it had been so.

In the cases where bacteriological examination was possible staphylococci seemed to predominate. It has been suggested that the clinical signs resemble a streptococcal type of infection, but no bacteriological proof is offered in support of the suggestion.—I am, etc.,

London, N.6, April 26. W. LEES TEMPLETON.

The Causes of Influenza

SIR,—Your leading article of this title (April 27, p. 694) was interesting. It would be useful if you could recapitulate the evidence that influenza is spread by contagion or droplet and gains entrance by respiratory channels. The prevalence of respiratory symptoms and the early sore throat are not in themselves sufficient evidence, for these are not constantly present in influenza and are often present in such diseases as malaria, tsutsugamushi fever, and Weil's disease, where the invasion is known to be non-respiratory. The infection of the smaller rodents and carnivora by nasopharyngeal washings is likewise not evidence of the route of invasion. The leptospira of Weil's disease may penetrate the skin or bowel and be recovered from the sputum. I do not wish to suggest an alternative method for the transmission of influenza, but would be grateful to know on what evidence our very common assumption rests.

Your remarks on the part played by herding together in ill-ventilated places and the importance of fresh air and ventilation in the prophylaxis of influenza are not borne out by the prevalence of the disease in such districts as this, where little change takes place in the habits of the population between the winter and summer months.—I am, etc.,

Beaminster, Dorset, April 28. R. E. HOPE SIMPSON.

Eggs in the Diet during Sulphonamide Therapy

SIR,—It has been frequently stated that while giving sulphonamide preparations eggs and onions should be withheld. I have had prepared for me, by the kindness of a well-known biochemist, a list of most of the ordinary foodstuffs in common use. In this it is interesting to find that, while boiled onions contain 23 parts per million of sulphur, boiled brussels sprouts contain 77 parts per million and cauliflower 29 parts per million. Again, while eggs contain 170 parts per million, Cheddar cheese contains 230 parts, whole-meal flour 123 parts, and white flour 108 parts per million. Admittedly eggs do contain a fairly high proportion of sulphur, but the amount of sulphur ingested per twenty-four hours by an invalid through eggs and through bread would not be materially different.

My reason for bringing forward this matter is that patients are being increasingly treated by sulphonamide preparations, and, as the patients are usually in a condition in which eggs are of considerable help in planning a diet, it would seem unfortunate that what appears to be a somewhat academic point should prohibit their use. It would be most interesting to hear what definite clinical evidence there is for this wholesale condemnation of a useful addition to the diet, and whether the sulphur in eggs is of a type which is particularly harmful to the human organism.—I am, etc.,

Harrow-on-the-Hill, April 24. O. R. TISDALL.

War and the Medical Services

SIR,—It is an ancient and very human failing to contend with the mote in our brother's eye while ignoring the beam in our own. When the brother is under 30 and we are over 50 this failing has become, as your correspondent "Twenty-seven" (*Journal*, April 20, p. 671) all too truly states, an established principle. I do not pretend to be immune from this form of protective autosuggestion in advancing years, but I am constrained to say a word in defence of my younger colleagues in the present controversy.

My own experience convinces me that the blood still runs true, and that the younger generation is just as ready to serve as we were. They do, however, expect, and are entitled to expect, vigorous, courageous, and enlightened leadership. I have no doubt whatever about their response to such. Are they getting it? This is the question which we, their seniors, should be asking of ourselves. I for one find it a very disquieting question. The adaptation of the medical services to the country's immediate and remote needs in this war is a mighty task, calling for real genius. Until there is more concrete evidence that such genius has been brought to light and is at work we elders should, I think, refrain from criticizing our younger brethren.—I am, etc.,

London, W.1, April 22. T. TWISTINGTON HIGGINS.

SIR,—The letter of "Resident Surgical Officer" (*Journal*, April 20, p. 671) expresses the feelings, I am sure, of many of the "under 30" members of the profession. Belonging to the same group as himself I would like to add something to the discussion. As things stand at present we are debarred from receiving the rank of a specialist, and therefore have to join the R.A.M.C. and accept the same rank and pay as many who have newly qualified. Such a state of affairs naturally makes us reluctant to enter the Army at the present time, since many of us also feel that our services are much more urgently required for civil medicine; and, indeed, we find that the Central or Local Committee is reluctant to put forward our names despite the fact that we had volunteered when the National Register was compiled. On the other hand, we have to consider that by holding back or being held back at present we are thus delaying our promotion when we shall have entered the Army, as seems most probable at some date. The situation for us is rather difficult, and one which the authorities seem hardly to have fully realized.

The paragraph on page 54 of the *Supplement* of April 20 under the heading "Consultants and Specialists" is possibly

the explanation of the position of the group to which we belong, but, as "R.S.O." points out, the recognition of our qualifications once we are inside the R.A.M.C. is not always effected. Perhaps it is the exceptions to the general rule which make our lot seem even harder. I can think of more than one instance in which contemporaries of mine, who happened to be attached to Territorial units at the outbreak of war, received specialist appointments on application and were raised to the rank of major. I can safely say that none of these has held a higher qualification as long as myself, and one had only obtained the F.R.C.S. three months before war started. These men would appear now to be the exception, and we, who have been told to remain as civilians and have borne the heavy end of the past winter's work, are going to be left out in the cold when we are required by H.M. Forces. Surely some equitable scheme could be devised whereby a man's qualifications would be given full recognition.—I am, etc.,

April 23. M.R.C.P.

The Mobile A.R.P. Hospital Unit

SIR,—In all town areas where hospital facilities are present that part of the A.R.P. organization known as the mobile hospital unit should be abolished. From my own observation, and from a study of Dr. Trueta's lectures to the medical profession of this country, based on experience in Spain, I am convinced that these units are a costly extravagance with very little practical value. The whole theme of Dr. Trueta's advice is to organize the hospitals so that they may deal rapidly and efficiently with a sudden influx of wounded civilians, and the elimination of all unnecessary stages likely to delay the transport of wounded to the hospitals.

These vans have very meagre facilities for sterilization. Therefore performance of any surgical measures, even of a minor character, under aseptic conditions is quite impossible. What, then, can we do? Most cases at exercises are either flesh wounds of varying degrees of severity or fractures. It does not require too much imagination to visualize the seriousness of many of these injuries and their complications—compound fractures and large infected wounds accompanied by dangerous haemorrhage. Most of these cases have already received first-aid treatment at the site of the incident, and I have been agreeably surprised by the efficiency of this first-aid work. I have not at my temporary hospital the facilities necessary to deal with these surgical cases efficiently. They must therefore be retransported to some centre where the necessary treatment can be given. Our chief function, then, must be to examine the first-aid measures already applied and if necessary reapply, then redirect to hospital. All this delay, together with the lifting and laying down of stretchers, must increase any shock from which the patient is suffering and endanger his chances of recovery. The injuries which the mobile unit could treat and send home must necessarily be of a minor character and could be even more efficiently treated in a department of the hospital, or even in some previously prepared annexe close by.

There are other arguments which may be advanced against the continued use of these mobile units, chief of which is the difficulty in obtaining suitable accommodation for setting up a temporary post within reasonable distance of the accident. There is a great possibility that the presence of such a unit, mobile as it is, may be overlooked or forgotten in the excitement of the moment and no casualties arrive for treatment.—I am, etc.,

Hove, Sussex, April 27. JAMES MCWHIRTER.

Boredom and Barbed-wire Disease

SIR,—May I make one more attempt to get my point "across"? Professor Major Greenwood (*Journal*, March 16, p. 448) first drew our attention to the fact that the personnel of many A.R.P. detachments in this country are showing symptoms of a kind of "boredom," ennui, or *taedium vitae*. Dr. Violet Russell (April 6, p. 588) then submitted a list of examples from Kensington of the way in which these people's interest in things may be maintained. They can, she says, be instructed in general medical topics, can visit the hospitals, can help with mothers and babies, or with the mending of gas-masks; various A.R.P. teams may get up competitions among themselves, and may be given lectures on all sorts of general subjects; concerts, dances, and other kinds of entertainments are feasible; some bored individuals may even set themselves to learn foreign languages.

All these suggestions are good. My particular thesis, however, was that this home boredom, as well as that reported from the Western front, constitutes a problem serious enough to warrant scientific—in fact, medical—investigation. I stated my belief that the condition is nothing less than an earlier manifestation of our old friend the "shell-shock" of 1914–18. More exactly, I think, it corresponds to that subacute form which has been described as "barbed-wire disease" (see the book under this title by a Swiss physician, A. L. Fischer, published in London in 1919). The condition is known in French as *névrose du fil-de-fer barbelé* and in German as *Stacheldraht-krankheit*.

If my contention that all these conditions are related is correct, surely the obvious thing to do would be to turn our "mental shock" specialists on to the job without further ado, and get them to "nip the malady in the bud." There are hosts of them at present, all "scheduled" for this work, all waiting to begin, all thirsting for the fray. But, alas! official theory apparently assumes that no mental shock can occur unless and until the bombs begin to fall upon the civilian population of Britain. That this is a profound untruth makes no difference, and I have little expectation that my hint will produce the slightest effect upon the authorities. Conceivably, nevertheless, an individual reflective medico here and there may read this letter sympathetically, and then some more prophylactic move may be made by the time "the next war" has started. As one who had much to do with the unfortunate people called "shell-shocks" in the last war, I venture to put in at least one plea for their successors in the days that lie ahead. Let their condition under no circumstances be treated as primarily a subdepartment of mental alienation.—I am, etc.,

Helmsley, Yorks, April 16. A. J. BROCK.

Occupations for A.R.P. Workers

SIR,—Might I suggest another most interesting and very desirable form of occupation which we in Camberwell mobile unit have adopted. It is reproducing maps of the borough on a large scale by means of that very useful instrument, a pantograph. How many of our A.R.P. workers are thoroughly conversant with their borough and its maze of streets, and how to get from one part to another in the shortest time and in the event of certain streets being blocked by fallen debris?

The nurses of this unit work in teams of four. The map of the borough is divided into three, and there is great competition which shall produce the best section. Once the section is completed there is a change over until each team has reproduced an enlarged map, easily read, of the whole borough. Questions are then set on how to get from one part of the borough to another in the event of certain streets being blocked. Fire stations, wardens' posts, first-aid posts, and hospitals are all marked clearly in separate colours.

The men of the unit, including drivers, work in two teams—night and day shifts. They have painted the wall of their rest room white, and, with the aid of an enlarged pantograph, made by them from 4-ft. laths, are reproducing a very large-scale map. One member of the team is in charge of the pantograph and traces the outline of the copy map with the bone point. Meanwhile, the pencil attached is tracing out the enlarged map. The main streets are first traced and side streets then marked in, each member committing to memory the streets to right and left of the main street. Later we intend to have inter-post competitions on our borough.

We have also started, with the "keep fit" object, an indian club class. Might I ask through the medium of your columns for the help of anyone who is willing to give instructions in a fencing class which we are trying to form.—I am, etc.,

Camberwell, S.E.22, April 22. JAS. F. MACKIE.

Long Survival after Omentopexy

SIR,—In the *British Medical Journal* for October 23, 1909, there appeared a short paper from my pen dealing with, "Two Cases of Ascites due to Liver Cirrhosis, treated by Operation." The first case quoted was a man, J. T., who came under my observation in 1906, with a history of ascites of twelve weeks' duration. He had been a heavy beer drinker, and the principal symptom was abdominal distension which was so distressing that he required to be tapped four times before admission to the Newcastle-upon-Tyne Royal Infirmary. I was asked to see the patient by the late Professor George Murray, and found a man of 46 years of age who was big and bulky and weighed 13 stone, though he had recently lost much weight. He looked ill, was very anaemic, and had a dirty tongue and very poor urinary output. The abdomen was full of fluid and there was also double scrotal hernia of large size, both sacs being distended with fluid. The man had been in the medical wards for six weeks, and during that time the abdomen had been tapped on four occasions, an average of twenty pints being removed each time. As the fluid was so rapidly reaccumulating and the patient was steadily going downhill Dr. Murray proposed the operation. This was carried out in November of 1906 and disclosed a small hobnail liver and a spleen of twice the normal size. The extraperitoneal venous plexus was markedly engorged and there were several vascular adhesions between the liver and the parietes, but not elsewhere. Despite tapping three days previously the abdomen contained a large quantity of dark straw-coloured fluid. The standard Rutherford Morison technique was employed, which, of course, included drainage of the pelvis by means of a Keith tube. Recovery was uninterrupted and the patient was able to leave hospital at the end of a month. There was still some fluid in the peritoneum and it was necessary to tap the abdomen a fortnight later, but only six and a half pints of fluid were removed, and he never required paracentesis again.

In May of the following year returning health and increasing self-respect impelled the patient to seek relief for his herniae, and a double radical cure was carried out under general anaesthesia. After operation one was a little anxious because the man became lethargic and slightly jaundiced; however, after about a week he began to brighten up, and thereafter recovery was rapid.

By August 1907 he was able to go back to his work as a labourer in a gas yard, and he continued at this strenuous occupation without interruption until the retiring age of 65. Thereafter he enjoyed his leisure and continued in excellent health and activity. He never touched alcohol, but drank milk and was very fond of sweets. The years wore away happily, and he has just died at the age of 80, after only a few weeks of illness. The immediate cause was said to be arteriosclerosis, but the wear and tear of his years was probably the deciding factor. His death therefore occurred just short of *thirty-four years* from the date of the omentopexy.

At the time the operation was carried out the subject was of topical interest because Rutherford Morison had published an account of the first successful case only ten years previously, and had brought the subject up to date by a paper in the *Annals of Surgery* for September, 1903. At a discussion at the British Medical Association meeting held in Toronto in 1906 the late Mr. Sinclair White of Sheffield reviewed the whole subject. At that meeting I was able to present a record of all the cases operated upon in Newcastle. Of the six properly selected cases which fulfilled the conditions laid down by Drummond and Morison, the authors of the operation, three were alive and well, one as long as seven years after the operation (this man remained free from recurrence after the lapse of a further eight years, when he was lost sight of); two had died five years and two years after operation, the one from an accident and the other from intercurrent disease; one case could not at that time be traced. For a good many years now the operation appears to have fallen into disrepute, but that, I think, is due to two principal causes—first and foremost the greatly diminished incidence of cirrhosis of the liver, and secondly the misconception of the purpose of the operation. The former reason is a matter for congratulation, though the latter is to be regretted.

It should be clearly understood that *omentopexy was never proposed as a cure for cirrhosis* but only as a method of treatment for ascites resulting from that condition. The originators laid down definite criteria for its success, which were that the ascites should be the result of alcoholic cirrhosis, that there should be no complicating cardiac or renal disease, and that the patient should have withstood two or more tappings. They also insisted that the proper technique in all its details should be employed. The principal steps are as follows: The abdomen is opened in the midline above the umbilicus and is emptied of fluid; the surface of the liver and spleen and the adjoining parietal peritoneum are mildly traumatized by scratching or rubbing with gauze for the purpose of setting up a reaction which will lead to the formation of adhesions. The omentum is then fixed by suture to the back of the anterior abdominal wall over a wide area, a Keith drainage tube is brought from the pelvis, and the parietal incision is closed. It is necessary that the abdomen should be firmly bandaged from above downwards with the idea of keeping the viscera in contact with the parietes. During convalescence the fluid is to be drawn from the Keith tube at frequent intervals until it has almost ceased to accumulate, which is usually at the end of about ten days or at the most a fortnight. In the few weeks immediately following operation ascites may recur to some extent, and if it does not disappear spontaneously it may be necessary to tap the abdomen on perhaps one or two occasions. Lastly, and perhaps one of the most important points, the patient must become, and continue, a total abstainer.

Quite apart from the use of the operation for the original purpose for which it was introduced I have found it to be a valuable adjunct in the treatment of ascites associated with Banti's disease, and for which splenectomy is the major interference. The operation has been tried in a whole variety of other conditions, but I believe it has only attained its full usefulness when employed for the condition as specified by the originators.—I am, etc.,

London, W.12, April 19. G. GREY TURNER

Safe Obstetrics

SIR,—In reply to Mr. Griffith Evans's letter (*Journal*, April 13, p. 635) I give below, through the courtesy of my chief, Dr. Oscar M. Holden, medical officer of health, a brief description of the conditions in Croydon, and some figures bearing on the points raised.

The Croydon obstetric service accepts patients whose incomes are below £500 per annum. Those offering full payment, whether for hospital or home delivery, are not assessed and their financial status is not gone into. Those who cannot afford full charges are assessed by a special assessment committee after full inquiry into income, rent, number of dependants, and other relevant points. During 1939, out of 1,579 women so assessed 179 (11 per cent.) were excused all payments on account of unemployment. This figure, however, understates the position, as a certain number of unemployed were entitled to maternity benefit, out of which they made a small contribution towards their expenses. Also, during the last four months of 1939 a certain number of men were absorbed into the Services who might otherwise have been unemployed. Certain concessions are made to the wives of men serving in the Forces. I regret I am unable to give the average weekly earnings of the families concerned. Such a figure would in any case not be a satisfactory one, as many of the patients paying full charges might, and often do, have incomes much bigger than those less fortunately placed.

The influence of malnutrition is very difficult to assess. While it must have some influence *per se*, this would be far greater if acting in conjunction with other factors, as haemorrhage, exhaustion from prolonged labour, puerperal sepsis, and so on. I cannot say that I have seen many marked instances of malnutrition in Croydon. It must be remembered, however, that part of our ante-natal care consists in the provision by

the Council, on the recommendation of the medical officers of the clinics, of free milk to those expectant mothers thought to require it. During the period from October 15, 1938, to October 30, 1939, free milk up to two pints per day was provided for 284 expectant mothers, and a small number were given free dinners also. This provision, no doubt, counteracted a certain amount of malnutrition. The Annual Report of the Chief Medical Officer of the Ministry of Health for the year 1938 (pp. 75–8), in an analysis of the confidential reports on 1,759 maternal deaths, gives the incidence of "poor general health or malnutrition" as 28. Among the deaths which I have investigated on behalf of the medical officer of health for the purpose of these confidential reports I did not find that malnutrition was a contributory factor in any. The deaths occurred, in fact, to a greater extent among the "comfortable" than the "poor," which agrees, in its small way, with the findings in the analysis mentioned above.

In reply to Dr. W. H. F. Oxley (April 20, p. 669), the period taken for the series was that during which 3,144 consecutive patients were "delivered by the service" without a death due to pregnancy. The case to which he refers as having been attended at home and admitted for post-partum haemorrhage was delivered on June 8, 1938, by an independent midwife, and therefore did not come within the scope of the paper.

Dr. Oxley refers to the official maternal mortality for Croydon for 1938 (0.87 per 1,000 births). This was the subject of a communication to the *Journal* by me on January 13 (p. 71). As to the omission of any reference to the sulphonamides, their inclusion would have made the paper still more inconveniently long than it already was. If Dr. Oxley will kindly refer to page 53 of the obstetric service special report for 1938 he will find a numerical summary of the cases treated with sulphonamide, with the statement that reference to the cases so treated will be found under the heading "Remarks" in the various tables. The tables relating to forceps deliveries, Caesarean section, manual removal of placenta, etc., are full of these references. Lastly, may I assure Dr. Oxley that no particular reason was intended to be inferred to account for the results. Many different factors contributed to them, the most important of which was the unremitting care and hard work of everybody concerned.—I am, etc.,

Croydon, April 26. RUFUS C. THOMAS.

The Occipito-posterior Position

SIR,—I was keenly interested in the article on the occipito-posterior position by Professor J. Bernard Dawson in the *Journal* of April 13 (p. 612). As I have something like ten thousand deliveries to my credit I feel I can speak with some assurance of that position.

In 1889, when I was a young assistant in the North, I was sent by my principal one afternoon to a maternity case. He said to me, "It is her eighth baby, so you will have little or no difficulty." On my arrival I found a large stout woman with a history of having been in labour for several hours, but was told that the pains were only "niggling" ones and were doing no good, though they were coming every five minutes. She had previously had very quick labours. As was the custom in many districts in those far-off days the old nurse woman had given her patient a dose of "coffee," as ergot was called then. This had done no good, so an hour afterwards I gave another dose, which did no good either. After waiting two hours more I said to myself, "I wonder if this is a case of an occipito-posterior." The presenting part was so high up in the pelvis that I could not reach it with my examining finger, and in those days I was not very good at diagnosis of the foetal position by abdominal palpation. So I said to myself, "Here goes," and passed my left hand up the vagina and grasped the head, thus being able to diagnose a fourth vertex position. I then rotated to a first vertex and waited for the next pain, still grasping the head. In a few minutes it came with a vengeance, so that the child, my hand, and my arm were all expelled with that one pain. This taught me a very valuable lesson. Ever afterwards I was never satisfied with simply diagnosing a presentation as a head, but invariably made a point of determining the position too. This saved me many hours of weary and wasteful waiting; it saved the woman hours of ineffectual pains; it minimized the hazard to the child; and it shortened the time of delivery considerably.

In my experience the occipito-posterior position is the commonest complication of labour. What the factor is in the causation of this position I cannot say. All I do know is that, with the one exception of a case where the baby weighed sixteen pounds, the majority of the babies which had been lying thus abnormally were small ones. Certainly it cannot always be due to a deformity of the pelvis, as I have known many multiparae in whom this position only occurred once.

As Dr. Dawson points out in his interesting and admirable paper, delivery may end in one of three ways—namely: (1) by spontaneous rotation; (2) by manual rotation with or without forceps; (3) by delivery with forceps applied to the unrotated head. The last is very unscientific, difficult, and harmful too. The forceps slip over and over again and there is grave risk of a torn perineum.

Spontaneous rotation does occur in many cases, as I can testify, but it is wrong to wait for that if one sees that the patient is getting exhausted by the "niggling" pains. In my opinion it is the bounden duty of the obstetrician first of all to make this diagnosis, and then, if it be a third or fourth vertex position, to convert to a second or first as the case may be. How is he going to do this? There is only one way, and that is by manual rotation (using the left hand), at the same time fully flexing the head. If the pains do not then become stronger he must apply the forceps and deliver. If he be not too impatient he will frequently find that, once the head has been successfully rotated, the pains will become stronger and the child will be born without any further help. One point to be remembered is that, although the head has been converted, the trunk sometimes fails to follow. Then if the grasp on the head be removed it will quickly fall back into the wrong position again. In such cases I have usually been able to manipulate the trunk through the abdominal wall with my right hand, at the same time holding the head in the correct position with my left. Nowadays some of these cases are treated by performing a Caesarean section. I am old-fashioned enough to consider this quite unnecessary in the majority of deliveries.—I am, etc.,

London, W.1, April 17. E. F. PRATT, M.B.

Cramp in the Legs

SIR,—I do not doubt the accuracy of Dr. Douglas A. Mitchell's statement (April 20, p. 678) that cramp in the legs was cured in hundreds of cases by putting corks in muslin bags and placing them in the bed, but I do doubt the correctness of his interpretation of the facts. The truth is that the great majority of patients who suffer from night cramps are neurotic, and the cramp is the result of a tense mind producing tension in the muscles. These patients are usually cured by such measures as sedatives, massage, and diathermy, as well as psychotherapeutic treatment, whatever form this may take. Some there are, however, who suffer from deficiency of sodium chloride in the blood. This again may be occasioned in some cases by neurotic dieting. Whatever the cause of the chloride deficiency, they suffer, like boiler workers who have sweated greatly and drunk much water without salt, with resulting "heat cramps." Everyone is familiar with cramp associated with swimming and other physical exercises, and cramp caused by severe diarrhoea, dysentery, and cholera is also well known. In the latter conditions there appears to be a very definite reflex factor, although this is not entirely the case with cholera, since it is said that the cramp occurs as well during the stage of convalescence. The circulatory factor is, of course, known to be the most important in the production of intermittent claudication, but unlike the cramps which occur at night there is here a definite association with exercise. Other diseases which may be associated

with cramp are chronic Bright's disease, Graves's disease, diabetes mellitus, gout, alcoholic neuritis, acute specific fevers, and chronic wasting diseases. The mechanism in some cases appears to be more obscure than in others. In ordinary cases the inhalation of amyl nitrite will promptly relieve the attack.

Wernicke's "cramp-neurosis" is a very rare disease of middle age in which there occur painful cramps of single muscles at first, and later of many muscle groups in different parts of the body. Associated with it there may be mild neuritic or radicular signs, including loss of reflexes, as well as arthritis in the spine and excess of uric acid in the blood. It may be diagnosed at once by the myospastic reaction, which consists of a circumscribed painful hardening of the muscle appearing shortly after stimulation by faradism, and lasting for several minutes after such stimulation has ceased.—I am, etc.,

Clifton, Bristol, April 22. FREDERICK SUTTON.

Device for Raising Injured Limbs on Stretchers

SIR,—The late Sir James Cantlie rightly urged the primary importance of controlling severe haemorrhage and removing obstruction to breathing before an injured patient was placed on a stretcher and before artificial respiration was applied. Haemorrhage is lessened by placing a patient on his back, but there is difficulty in raising an injured limb on present-day stretchers except on pillows. This difficulty would be overcome if slightly wider stretchers were employed and a stout band passed under the injured limb so that when this was shortened the body would sink into the sagging stretcher, leaving the limb supported on the band some inches above the level of the abdomen. Support for the elbow is particularly pleasing, but in the case of injury to either upper or lower limbs two such bands are required, and these keep the sides of the stretcher parallel. When only one band is required for supporting a limb the other limbs rest under the bands, which thus help to control restlessness. When both are out of use they can lie under the patient or be removed from the stretcher.

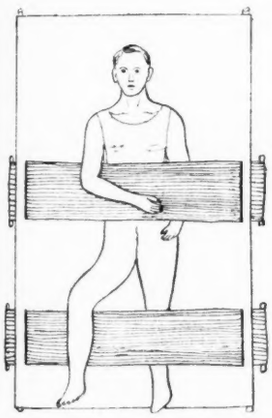


Diagram to show supporting bands, nine inches broad, passing through suitably placed windows cut in the stretcher for diminishing the width as required.

When, as in Natal, city ambulances are sometimes required to convey patients to a convenient hospital over a distance of fifty miles, the need for supporting an injured limb, if only to keep it cool when a tourniquet is applied, is apparent. Any assistance in the control of haemorrhage or in adding comfort in such cases deserves consideration, and the system, of which an illustration is given, though devised for use with the usual hand stretchers, might be applied to motor ambulances where mattresses render other methods necessary. The idea was conceived in Durban through the death from haemorrhage of a victim of a shark's bite and from a too widespread readiness to resort to artificial respiration in cases of drowning.—I am, etc.,

Durban, April 12. F. GORDON CAWSTON, M.D.

Schick Immunity after Immunization

SIR,—I read with interest Dr. John F. Warin's article on Schick immunity after diphtheria in the *Journal* of April 20 (p. 655). Doubtless most people who have Schick-tested cases with a history of diphtheria will have found roughly similar results. Even if we could take for granted that all diphtheria bacilli produce an antigenic response to the same degree, excluding variations due to difference in site, would the administration of serum not lead to a "modified" rather than a "natural" attack, and would the day of disease and amount of antitoxin administered not be potent factors in determining the ultimate degree of immunity acquired? Is there not a possibility that many of these cases acquire at the time of the disease a passive rather than an active immunity and, therefore, do not have a Schick relapse in the true sense of the term?—I am, etc.,

Belfast, April 23. H. A. WARNOCK.

Results of Fascial Sutures for Herniotomy

SIR,—Mr. A. Wilfrid Adams suggests (*Journal*, April 20, p. 669) that it would be valuable if individual surgeons reported their series of cases of hernia repaired by fascial suture.

Last year I completed a follow-up of 343 cases of miscellaneous herniae operated upon by me in the ten years ending 1938. The recurrence rate was 3 per cent. In nearly all the cases the fascia was obtained from the thigh, for I have found that those patients most in need of fascial repair are the very ones with a feeble, friable external oblique aponeurosis.—I am, etc.,

London, W.1, April 22. HAMILTON BAILEY.

Aerophagy

SIR,—To the interesting and worth-while article on aerophagy by Dr. S. Watson Smith (*Journal*, February 24, p. 296) I would add that often in patients suffering from aerophagy the pathogenesis is a respiratory one: the inclination to "habitual oral breathing." This functional aberration facilitates swallowing a part of the air entering through the parted lips. The "tertium comparationis" I could often see accomplished: the disappearance of these symptoms after education in the constant use of the nose as primary air passage.—I am, etc.,

Albany, N.Y., April 11. LUDWIG HOFBAUER, M.D.

Free Choice of Doctor

SIR,—It was a pleasure to read Dr. Douglas Boyd's letter in the *Journal* of April 27 (p. 712) and find the subjects of "free choice of doctor" and "individualism in medicine" discussed in such a rational way. Individualism in medicine is an ideal that is difficult to achieve and even harder to maintain. There are so many doctors who cherish this ideal that it is surprising to see them adopt an attitude of defeatism in the face of the steady mopping-up operations of the various local government bodies. Unfortunately the supporters of individualism tend to isolate themselves and will not create a common front to defend their ideals. They selfishly take the freedom their predecessors gained for them for granted, and as a result of their ensuing apathy encourage the Government authorities to continue their encroachments on medical practice.

It must be asked whether there is any stage in the career of the general practitioner where this apathy towards the ultimate fate of the organization of the medical profession arises, and it is suggested that it is partly a result of the present training the practitioner receives at his medical school. It seems a fundamental error to let the training of the practitioner remain exclusively in the hands of the specialist, whose teaching is solely concerned with the academic side of medicine. Let us hope, then, that the champions of individualism will hammer at the doors of the teaching hospitals till they convince them that since the majority of their students will become general practitioners they must widen the ranks of their teaching staff. It is reasonable to expect that a specialist in the problems of general practice should be appointed to the staff of every teaching hospital in the country so that the newly qualified practitioner will feel as competent to stand up for his ideals as he will be to treat his patients.—I am, etc.,

H. STEPHEN PASMORE, M.B., B.S.

London, W.11, April 27.

*** This correspondence is now closed.—ED., *B.M.J.*

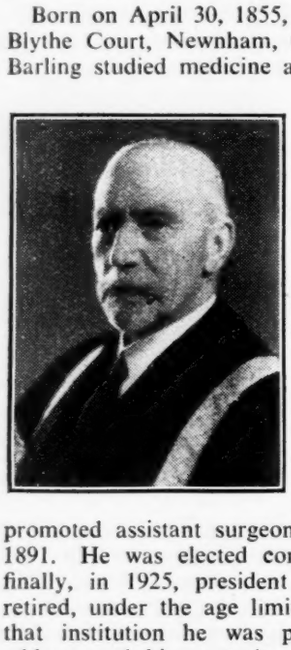
Obituary

SIR GILBERT BARLING, BT., F.R.C.S.,

Consulting Surgeon, Birmingham General Hospital

Sir Gilbert Barling died on April 27, three days before his 85th birthday. Last week the governors of the Birmingham United Hospital at their annual meeting offered hearty congratulations to "an inspiring teacher, a great administrator, and a devoted servant of the hospital," on his completion of sixty years of active service. A letter was read from the Prime Minister joining in the congratulations and declaring Mr. Chamberlain's admiration for Sir Gilbert Barling's long record of public service in Birmingham.

Born on April 30, 1855, the son of William Barling of Blythe Court, Newnham, Gloucestershire, Harry Gilbert Barling studied medicine at St. Bartholomew's Hospital; he graduated M.B.Lond. in 1879, and served as house-surgeon there after winning scholarships in anatomy and physiology and the Kirkes gold medal in clinical medicine. He then went to Birmingham as resident pathologist to the General Hospital, and thus began the long connexion with that city which ended only with his death. In 1881 he obtained the F.R.C.S., and soon after was appointed resident surgical officer at the Birmingham General Hospital, being promoted assistant surgeon in 1885 and full surgeon in 1891. He was elected consulting surgeon in 1915, and finally, in 1925, president of the hospital. When he retired, under the age limit, from professional service to that institution he was presented with an illuminated address and his portrait was hung in the board room. The address placed on record Mr. Barling's exceptional abilities as a surgeon and the invaluable work he had done in the conception, planning, and equipment of the hospital and in the promotion of it as a medical, surgical, and nursing school.



During those years of busy professional and administrative work he acquired the chief surgical practice in Birmingham, and in many ways served the city with efficiency and devotion. From 1913 to 1927 he held the office of Vice-Chancellor of the University, and from 1927 to 1932 was Pro-Chancellor. Before the creation of the University he had long been a member of the teaching staff of the Birmingham Medical School as professor, first of pathology and later of surgery, and as dean of the faculty of medicine. He was Ingleby Lecturer in 1895, and received the honorary degree of LL.D. in 1937. For a large part of the last war he acted as consulting surgeon to the Forces at home and over-seas with the rank of colonel A.M.S., and for his services was created C.B. in 1917 and C.B.E. in 1919, in which year he received the honour of a baronetcy.

Sir Gilbert Barling, who had been a member of the Council of the Royal College of Surgeons of England from 1904 to 1912, represented the University of Birmingham on the General Medical Council from 1917 to 1927. In recent years he received the Birmingham Civic Society's gold medal, and became chairman of the Birmingham Branch of the British Empire Cancer Campaign and of the Mental Diseases Research Committee. He had joined the British Medical Association in 1880 and served for two years on the Parliamentary Bill Committee at headquarters in London. He was chairman of the Birmingham Central Division in 1904 and president of the Birmingham Branch in 1911; when the Association met in that city in 1890 he was honorary secretary of the Section of Surgery, and at the Cheltenham Meeting in 1901 he was vice-president of the same Section. At the London Meeting in 1910 he delivered the address in Surgery, taking as his subject malignant disease. During the close of his life, when the great scheme for the Birmingham Hospital Centre was developing, Sir Gilbert became chairman of the Birmingham Hospital Council; he was also chairman of the local Hospitals Guild and of the Amalgamated Orthopaedic Hospital and Cripples Union.

[The photograph reproduced is by H. J. Whitlock and Sons, Ltd., Birmingham.]

ARTHUR EDWARD MILLS, M.B., Ch.M.

We record with regret the death on April 10 at Sydney of Dr. A. E. Mills, late Deputy Chancellor of the University of Sydney. Dr. Mills had been a member of the British Medical Association for fifty years, joining in 1891.

Arthur Edward Mills was one of the 1889 class of medical graduates of the then recently established medical school of the University of Sydney. The class of the preceding year was, indeed, the first to graduate from that young school. He had entered, in 1884, upon the five-years curriculum, of which the first year was in those days devoted entirely to Arts subjects. Before entering the university Mills had been engaged for a brief period in elementary-school teaching.

After holding resident house appointments in the Prince Alfred Hospital during the year 1889–90 Mills became demonstrator of anatomy in the University of Sydney in 1890–1. Leaving for a time the academic sphere, he took up country practice at Picton, N.S.W., migrating later to Strathfield, near Sydney. Here began his long-maintained association with the "Infants' Home," and that enduring interest in the nutrition and medical care and treatment of young children which marked his whole professional career. After a period of years of successful suburban practice Dr. Mills came over to England in 1905 to visit hospitals and medical schools, and here for a time he worked in the laboratory of his old friend Sir Almroth Wright at St. Mary's Hospital. On his return to Sydney he took up consulting practice in Macquarie Street, and was later appointed an honorary assistant physician in the Royal Prince Alfred Hospital, where in due course he became a full honorary physician. In 1910 he was appointed lecturer in medicine in the University of Sydney. In 1915 Dr. Mills offered his services to the Commonwealth Government and left Australia for oversea duty with the rank of major. He had anticipated employment on foreign service, but was actually assigned for duty with the Australian General Hospital, Horseferry Road, Westminster. On his return from war service he again took up the duties of his lectureship in medicine in the medical school and hospital until, in 1920, he was elected to the newly established part-time chair of medicine. This position he retained until 1930, when the chair was converted into a full-time professorship. In 1920 he had been elected dean of the faculty of medicine, and held this office until 1926. From 1920 to 1925 and again from 1929 to 1939 he was a Fellow of the University Senate. In 1938

he was nominated by the Senate as Deputy Chancellor, and occupied this honorary office until his retirement from the Senate in 1939. In addition to his various other duties and offices Dr. Mills acted for a lengthy period until the end as chief medical referee for the Mutual Life and Citizens' Assurance Co.

No mere chronicle of the events of his career or of the work he accomplished during the half-century from his graduation in 1889 could give any but the faintest indication of the results of this long period of devoted effort or of the high appreciation and esteem in which Dr. Mills was held by his students, his colleagues, and by the community which he served so faithfully and well. As an enthusiastic and stimulating teacher, both in the classroom and by the bedside, he has left his mark on many successive generations of medical students. His methods of instruction, if somewhat unconventional, were effective and even striking, and gained the tribute of an unflagging attention and interest. But, above all, his genial and humorous personality, combined with his genuine helpful interest in the individual, won for him the affectionate attachment of students and patients alike. For legions of the latter, both in hospital and in the home, he was ever the pattern of "the beloved physician," as indeed he was portrayed, under the halo of St. Luke, in the journal of the (Undergraduate) Medical Society of the University of Sydney.

JOHN TATE, M.R.C.S., D.P.H.

By the death on April 21 of Dr. Tate, county medical officer of health for Middlesex, the public health service of England has lost one of its most able and distinguished administrators, and one who has played no small part in moulding public health policy in this country.

John Tate, who came of an old Yorkshire family, was born at Bradford in 1880. He was educated at Bradford Grammar School and University College Hospital, where, after qualification, he held several house appointments. He early realized the potentialities of preventive medicine, and in 1908, as assistant medical officer, entered the service of the county of Middlesex. At that time county councils had no serious claim to consideration as health authorities, and the staff of the public health department, which to-day numbers several thousands, consisted of the county medical officer, an inspector of midwives, and one clerk. After a few years of clinical work Dr. Tate in 1913 became deputy county medical officer, and brought his logical mind to bear upon the new health services which were beginning to develop under county administration. Time has proved that the foundations he laid were sound and solid. Although the health services have vastly expanded in many directions, the fundamental systems on which they are based remain unchanged, by reason of the foresight with which they were conceived.

When his chief retired in 1923 Dr. Tate became county medical officer of health. On the passing of the Local Government Act in 1929 he threw himself whole-heartedly into the task of transforming the Poor Law institutions, handed over to the county council by the late boards of guardians, into the magnificent hospital organization which they are to-day. It was ever in his mind that the strength and efficiency of a hospital lie in the brains and character of its staff, and not in mere bricks and mortar and equipment. As one of his first acts, therefore, he evolved, and advised the Middlesex County Council to adopt, a grading scheme of salaries and conditions of employment designed to attract to and retain in the council's service men and women of the highest professional and personal qualities. As a result the staffing of the Middlesex county hospitals is second to none, and appointments in the service are greatly sought. After the question of staffing came many and intricate problems of hospital modernization, adaptation, and extension, and this work, which continued up to the time of his death, gave scope to his imagination and ingenuity. He was an active member and a past president of the Association of County Medical Officers, a member of the County Councils Association, and he served on the Committee for the Prevention of Blindness set up by the Ministry of Health. In the war of 1914–18 he was a captain in the R.A.M.C., and saw active service in France.

Dr. Tate (writes a colleague) had a well-balanced, logical, and orderly mind, and in addition to his gifts of foresight and imagination possessed a fund of sound common sense. He had the power to a remarkable degree of being able at a glance to see the many aspects of a complicated problem; and then, in a few lucid sentences, to analyse its complexities and indicate the path along which solution was to be found. This faculty deeply impressed all those who worked with him, and much of his success was due to his skill in exposition, in clear and logical sequence, of an abstruse medical or technical problem to a lay committee. As a chief he was admirable; loyal to his council, his colleagues, and his staff, by whom he was respected and loved. Perhaps the quality by which he will be most remembered is his magnificent courage during his last illness, which was long and painful. For over a year he realized his fate, but never did he flinch, or by word or sign complain or descend to self-pity. During a temporary improvement in his condition he returned to his work just before the outbreak of war, and carried on cheerfully till the new year, when increasing severity of symptoms and almost intolerable pain compelled his return to hospital. His conduct during those many black days when he was facing death was an inspiration and example to all those privileged to work with him.

Dr. CHARLES BANKS, V.D., Bengal Uncovenanted Medical Service (ret.), died at Barnes on April 13, aged 76. He was educated at the University of Glasgow, where he graduated M.B., C.M. in 1886, subsequently taking the M.D., with commendation for his thesis, in 1895, and the D.P.H. of the Royal Faculty of Physicians and Surgeons of Glasgow in 1890. In 1892 he obtained an appointment in the Uncovenanted Medical Service in Bengal, and was serving as civil surgeon of Pari in 1897, when plague first appeared in Bengal. The Bengal Government determined to have a great clean-up of Calcutta to remove as much as possible of the accumulations of filth of the past three centuries, and Banks was specially appointed to this unpleasant and difficult job, which he tackled with great diligence and some success. Subsequently he held the posts of protector of emigrants, Calcutta, and of health officer of the Port of Calcutta. He received the Kaisar-i-Hind Medal for his services. He was a keen volunteer, holding the rank of surgeon major of the 1st Battalion of the Calcutta Volunteer Rifles, and received the V.D., the decoration for twenty years' volunteer service. After his retirement from India he was for some time medical superintendent of the Kaikoura Hospital in New Zealand. He was the author of several works on sanitation, including *A Manual of Hygiene and Domestic Economy for India and Burma* and *Physiology, Public Health, and Psychology*. For his M.D. thesis he took as his subject epidemics of cholera in India, with special reference to their immediate connexion with the pilgrimages.

The death took place on April 14 of Surgeon Commander ARTHUR HOLMES JOY, R.N., medical superintendent of the East Lancashire Disabled Sailors' and Soldiers' Home, Broughton Park, Manchester. Surgeon Commander Joy was the son of the late Robert Joy, J.P., of Banbridge, Co. Down, where he was born in 1884. He was educated at Tonbridge School, and received his medical training at Queen's College, Belfast, qualifying M.B., B.Ch. of the old Royal University of Ireland in 1908. Almost immediately after qualification he entered the Royal Naval Medical Service, where he had a distinguished career, being highly esteemed by all naval men with whom he had to do. During the last three years of his naval service he was medical officer to the Royal Naval

College, Greenwich, the first of the four colleges of the senior service. He retired from this post in March, 1939, on reaching the age of fifty-five. He then became medical superintendent of the home at Broughton Park, where in a very short while he gained great popularity. Although very ill, he continued his work at the home until a few hours before his death. Surgeon Commander Joy was a member of the British Medical Association for thirty-one years.

We regret to record the death at Berkhamsted, Herts, at the age of 75, of Dr. FRANCIS W. CLARK, formerly professor of medical jurisprudence and dean of the medical faculty of Hong Kong University. A native of Plymouth, he was educated at St. Paul's School, and at St. Bartholomew's and Middlesex Hospitals. He took the English Conjoint qualifications in 1886, the D.P.H. of Cambridge in 1891, the D.T.M. and H. in 1908, and the M.R.C.P. in 1909, having graduated M.D. of the University of Durham in 1900. Dr. Francis Clark was a barrister-at-law of the Middle Temple, and during his long service at Hong Kong was president of the Hong Kong and China Branch of the British Medical Association in 1906; he also served, on three occasions, on the Central Council, and had been a member of the Dominions Committee and vice-president of the Section of State Medicine at the Annual Meeting of the Association in London in 1910. He published papers on enteric fever, kala-azar, and leprosy, and was for some years editor of the *Transactions of the Far Eastern Association of Tropical Medicine*. From 1924 to 1929 he was medical officer of health and senior medical officer at Wei-hai-wei.

The following well-known foreign medical men have recently died: Dr. ALEXANDRE DESGREZ, emeritus professor of medical chemistry in the Paris medical faculty, member of the Académie de Médecine and of the Académie des Sciences, aged 76; Dr. JULES PAYOT, a former rector of the Academy of Paris and author of a work on education of the will which went through thirty editions, aged 81; Dr. JULES SÉGLAS, a Paris psychiatrist, aged 83; Dr. WILHELM VON SPEYR, director of the Waldau Asylum in Berne and professor of psychiatry at Berne, aged 86; and Dr. ROSOLINO COLELLA, emeritus professor of neuropsychiatry at Palermo.

At the February meeting of the Bombay Medical Council the president, Major-General H. C. Buckley, I.M.S., moved from the chair a resolution placing on record the deep sense of sorrow of the Council at the death of Kahn Bahadur Sir NUSSERVANJI H. CHOKSY, Kt., C.I.E., M.D., who was a valued member of the Council from the time it was constituted in 1912 up to 1937. The resolution was unanimously passed, all standing.

Dr. GABRIELE POSANNER-EHRENTAL, the oldest woman doctor in Vienna and the first woman in Austria to become a doctor, has died at the age of 81.

In the county of London and neighbouring evacuation areas only 9.5 per cent. of school children have been registered by their parents for evacuation under the Government's new scheme. The parents of 16 per cent. of the children have declined to register them, and the parents of 74 per cent. have made no reply. Should a new evacuation be necessary the London County Council considers that it might well be that a much larger number of children would present themselves than the number registered, in which case it would be necessary to add considerably to the medical and nursing staff. The Council's medical officer of health is in touch with the Central Medical War Committee to secure adequate reinforcements of the Council's staff to carry out the work at appropriate fees which have been approved by the Ministry. Preliminary arrangements have been approved in London for the registration of all expectant mothers who might wish to go into the country during the last month of pregnancy in the event of actual or threatened bombing. From particulars of beds at present available it appears that some 3,000 women could be taken into the country every month for the birth of their children. It is understood that arrangements have been made for sufficient midwives to be present in receiving areas.

Medico-Legal

DAMAGES FOR AN X-RAY BURN

Damages of £750 were awarded at Manchester Spring Assizes against Dr. J. R. Caldwell of Milnthorpe, Westmorland, in an action by a patient who alleged that he had burnt her skin by the negligent use of *x*-ray treatment. The patient, Miss Mabel Ball, said she had injured her left breast early in 1933 and had consulted Dr. Caldwell, a general practitioner with an extensive practice and a considerable reputation. He gave her *x*-ray treatment and the condition cleared up until the autumn of 1934. She again consulted the doctor, who told her there was nothing to worry about as the condition could not be malignant, and he again gave her *x*-ray treatment. She made further visits, and early in 1938 she saw the doctor's partner, who prescribed a sedative. In March, 1939, she again saw Dr. Caldwell, who wished to apply an electric needle, but she would not agree. She was then complaining of a skin discoloration which made it impossible for her to wear low-cut dresses or a bathing costume. She brought three medical witnesses who said the mark was due to a healed *x*-ray burn. Dr. Caldwell said in evidence that he had been using *x* rays for more than thirty years. He first remembered attending Miss Ball at the end of October, 1934; he found a hard lump and considered the condition was malignant. He decided to irradiate the place, and used an induction-coil apparatus with a Coolidge tube working at 150 kV, giving one-third of a skin erythema dose. He saw her again on November 13 and gave her double the previous dose. He examined her on November 27 and again in January, 1935, when the malignant growth had disappeared. He did not then see her until early in 1939, when he was greatly surprised to find so much inflammation. Counsel for the lady, referring to the evidence of her witnesses that she had never had a malignant growth, asked the doctor if he did not think it possible that he had made a mistake. He replied that there could be no absolute certainty that he had not. He agreed that there was a burn, and took full responsibility for it. He also agreed that the apparatus required constant watching; he was in and out of the room during treatment, but never further away than the adjoining room. He could tell by the humming that the apparatus was running properly. He did not agree that its output could fluctuate wildly. He had never had a similar experience to the present case, and could not understand it. Mr. Justice Singleton gave Dr. Caldwell credit for his complete frankness, but found that the condition arose from his negligence. The newspaper report of the case[1] does not indicate what evidence of negligence, as opposed to mere error of judgment, the plaintiff produced. It gives the impression that, as often happens in practice, the burn itself was regarded as sufficient evidence of negligence.

GASTRIC ULCER AND EXPECTATION OF LIFE

Mr. Justice Hilbery had recently[2] to assess the value of the expectation of life of a woman of 69, whose death occurred through the negligence of a medical man. Reference was made in this column last year to another aspect of the case.[3] The deceased lady was single and of independent means; evidence was given that she was in very good health for her age, was very wiry and active, and thoroughly enjoyed life. She was attended by the doctor for painful arthritis of the shoulder; he injected an overdose of percaine, and this drug caused her death. A pathologist said that at necropsy he had found the heart slightly enlarged, with incipient degeneration, and an abnormally large ulcer in the stomach. There would probably have been a recurrence within a few months of the haemorrhage

[1] *Manchester Guardian*, March 20 and 21.
[2] Grice *v.* Tuke, *Monmouth Daily Echo*, March 2.
[3] *British Medical Journal*, 1939, **2**, 888.

from which she had previously suffered, and she would not have survived a major operation for the removal of the ulcer. Counsel were unable to agree on the quantum of damages, and the judge therefore had to face the problem of assessing the damages under this head. Considering that she would almost certainly have been dead in six months, that those six months would not have been enjoyable, and that her death would have been painful, he awarded her estate only £156 15s. 6d. and costs.

COMPENSATION FOR DOUBLE INJURIES

Difficult problems sometimes arise in workmen's compensation cases where a workman who is already incapacitated by one accident claims compensation for injury caused by a second. If both accidents are actual physical ones the compensation for the second accident can only be based on the proportion of incapacity left over, so to speak, from the first accident. If the first accident causes total disability, then there is no compensation for the second accident. This principle is, however, complicated by the provision of law which lays down that an industrial disease is to be regarded as an accident. When a doctor certifies that a man is suffering from an industrial disease the certification operates as a notional accident, and then the compensation may not be more than half the workman's weekly earnings during his last twelve months in the employment in the process which has given rise to the disease. The House of Lords had recently to deal[1] with a slightly different problem.

A collier met with an accident at work on August 12, 1935, and had several ribs broken. Until December 9, 1936, he was paid compensation for total incapacity at 30s. a week, and then the payment was reduced to 19s. a week, his earning capacity having partially returned. On February 22, 1937, the Silicosis Medical Board certified that he was suffering from silicosis as a result of his employment, and dated the disability back to November 18, 1936, when he was still totally incapacitated by the accident to his ribs. The employers accordingly again paid him 30s.: 16s. 9d. in respect of the rib accident and 13s. 3d. for the silicosis. On July 15, 1937, they served notice on him alleging that he had wholly recovered from the rib accident, but continued to pay him 30s. solely in respect of the silicosis. On August 22, 1938, he claimed arbitration, alleging that, apart from the 30s. he was receiving in respect of the silicosis, he was still entitled to the 16s. 9d. he had been receiving in respect of the rib accident. The county court judge held that at the time of the notional accident —the certification of the silicosis—the workman was still partially incapacitated by the rib accident, and awarded him 16s. 9d. per week from July 15, 1937, when the employers had stopped the payment. That award was confirmed by the Court of Appeal.[2] The workman then made another application claiming 30s. a week for total disablement by silicosis from December 17, 1936, credit being given for the amounts already received. He stated that since July 15, 1937, he had received in all only £1 2s. 3d. per week for silicosis, based on an earning capacity agreed with him by the employers to be £1 19s., due to his existing partial incapacity on November 18, 1936, which had been brought about by the 1935 rib accident. He contended that under the Various Industries (Silicosis) Scheme, 1931, he was entitled to assess his pre-accident earnings before November, 1938, for the purpose of assessing compensation for incapacity due to silicosis, on the basis of the earnings of the twelve months during which he was last employed in the process in which he contracted the disease. By this reckoning he would be entitled to compensation at the rate of 30s. a week and not £1 2s. 3d.

The Court of Appeal held that he was entitled to compensation for the silicosis at the full rate of 30s. a week, and that the rate of compensation should be based on his earnings during his last twelve months of employment in the process which gave rise to the disease, and not on his earnings at the date of the certification. The payments made in respect of the rib accident ought not to be taken into account, as they were made in respect of a different liability. They took the view that the workman notionally met with his silicosis accident on November 18, 1936, and during the year of his notional injury preceding the accident he was deemed to be physically capable of earning £3 11s. 1d.—his full wage. His earning capacity from November, 1935, to November, 1936, though it was really reduced by his rib accident to a partial capacity on December 9, 1936—to £1 19s.—was notionally to be regarded as unimpaired. The case was taken out of the category of a second physical accident acting upon an already limited capacity, and must be deemed to be a case in which, notwithstanding a partial incapacity due to the rib accident, the silicosis scheme requires the workman in the circumstances to be assumed to be of full capacity and to be capable of earning his full wages at the date when he was certified to be wholly incapacitated by silicosis. As Lord Justice Slesser put it, once it is realized that in industrial disease the Legislature, in its humorous wisdom, has ordained that, contrary to natural experience, the injury (the disease) must be regarded as preceding the accident (the certification), the paradox of a notional full capacity when actually there is partial disability is resolved.

[1] Evans v. Oakdale Navigation Collieries, Ltd., 1940, 2 All E.R., 201.
[2] 1939, 2 All E.R., 358.

A SEDUCTION CHARGE DROPPED

Dr. C. P. Mann, formerly of West Bromwich and now serving with the Forces, successfully defended at Birmingham Assizes[1] an action for seduction and loss of services brought by the father of the woman, who said that the doctor had taken her out for a drive in his car and seduced her. Giving evidence, the woman said she had believed she was going to have a baby. Dr. Mann told her he would not marry her, so she went to his partner to expose him. She had not been able to sleep properly or do the housework. In cross-examination she said she had never "had a young man" and found things a little monotonous; she wanted to "show him up." Counsel for the doctor submitted that the woman had suffered from hallucinations but was sincere. The doctor would, if called upon, have denied all the allegations. Counsel for the father threw up the case, and judgment was given for the doctor with costs.

[1] *Daily Telegraph*, March 28, 1940.

The Services

NAVAL COMPASSIONATE FUND

At the quarterly meeting of the directors of the Naval Medical Compassionate Fund, held on April 19, Surgeon Vice-Admiral Sir Percival Nicholls, K.C.B., K.H.P., Medical Director-General of the Navy, in the chair, the sum of £274 was distributed among the several applicants.

MENTIONS IN DISPATCHES: ROYAL NAVY

The following medical officers of the Royal Navy have been mentioned in dispatches.

Surgeon Lieutenant-Commander Hugh Latimer Cleave, R.N. (H.M.S. *Nelson*), "for zeal, enterprise, and devotion to duty in ordering his sick bay from a state of chaos, and for his skilful and untiring care of the wounded."

Surgeon Lieutenant Alexander Donald, R.N. (H.M.S. *Viscount*), "for zeal, devotion to duty, and skill in caring for the sick and wounded survivors of S.S. *Domala*, bombed by the enemy."

CASUALTIES IN THE MEDICAL SERVICES

Royal Navy

The name of Surgeon Lieutenant Horace Garner Evans, R.N.V.R., is included in the Admiralty's list of missing officers and men of H.M.S. *Hunter*. The official announcement says: "There is a faint possibility that a very small number of these officers and ratings may be prisoners of war, but there is no confirmation of this as yet." Dr. Evans graduated M.B.,

Ch.B. of the University of Liverpool in 1931, and joined the British Medical Association in the same year. He was in partnership with Dr. Andrew Watson of Wellingborough, Northants, and had previously held the posts of house-surgeon and house-physician at the Royal Infirmary, Liverpool, senior resident medical officer at the Royal Children's Hospital, Liverpool, and obstetric officer at Walton Hospital, Liverpool.

ROYAL ARMY MEDICAL CORPS

The Army Council's Casualty List No. 3 includes the name of Major HERBERT FREDERICK WILFRID ADAMS, R.A.M.C., who died after a short illness on December 31, 1939, at the age of 51. Major Adams graduated M.B., Ch.B. at the University of Edinburgh in 1912 and took the D.P.H. of the Scottish Conjoint Board in 1920. He was medical officer of health to the East Gloucestershire United Districts.

DEATHS IN THE SERVICES

Lieutenant-Colonel HERBERT HALLILAY, I.M.S. (ret.), who died suddenly at Bombay on February 14, was born on May 27, 1876, was educated at Westminster Hospital, and took the M.R.C.S., L.R.C.P. in 1900. After filling the posts of prosector to the Royal College of Surgeons of England, of house-surgeon and house-physician to the Westminster Hospital, and of house-physician to the Bethlem Royal Hospital he entered the Indian Medical Service as lieutenant on July 26, 1902, became lieutenant-colonel after twenty years' service, and retired on April 17, 1931. He served during the war of 1914–19, in Persia in 1918–19, and was mentioned in dispatches on two occasions. After five years' military duty he was appointed a plague medical officer in the Punjab and a civil surgeon in that Province, and spent the rest of his service there, except that he returned to military duty during the war of 1914–19 for five years, from August, 1914, to July, 1919. He had held the civil surgeoncies of Murree and Simla West. He had been a member of the British Medical Association for twenty-three years.

We have received further particulars of the career of Major J. A. W. EBDEN, whose death was recorded in the *Journal* of December 16. After joining the I.M.S. ten years ago he was on military duty for some time. In January, 1932, his services were placed at the disposal of the Government of Madras, and as principal and professor of surgery at Vizagapatam he was largely responsible for bringing the medical college up to its present state of efficiency. He was also for some time professor of operative surgery at the Madras Medical College. On returning from a prolonged tour of surgical clinics in Europe last year he was acutely disappointed to find that his plans for the improvement of the Vizagapatam Medical College had been held up, and this was largely responsible for his acceptance of the post of chief medical officer, Delhi, where his services would be used in organizing the proposed Imperial College of Medicine. A colleague writes: "John Ebden's vigorous personality made a deep impression wherever he went. He was an outspoken and fearless critic. His views, inevitably, did not always coincide with those of his superiors; but there was no doubt either of his sincerity or of his intelligence."

Universities and Colleges

UNIVERSITY OF OXFORD

At a Congregation on April 26 the degree of D.M. was conferred on G. A. Hodgson.

UNIVERSITY OF CAMBRIDGE

Marie Jahoda, Ph.D.Vienna, has been reappointed to the Pinsent-Darwin studentship for the study of mental pathology for one year from January 1 last. The value of the studentship is about £225 a year.

At a Congregation on April 27 the following medical degrees were conferred:

M.D.—*B. S. Jones.

M.B., B.CHIR.—*P. G. H. Gell, *J. H. P. Gauvain, *G. H. P. John, *R. D. Kennedy, *T. J. A. Phillips.

* By proxy.

UNIVERSITY OF LONDON

The degree of D.Sc. for internal students has been awarded to Phyllis A. Clapham (London School of Hygiene and Tropical Medicine).

The Academic Postgraduate Diploma in Public Health has been awarded to T. K. Abbott (London School of Hygiene and Tropical Medicine).

The following candidates have been approved at the examination indicated:

POSTGRADUATE DIPLOMA IN PSYCHOLOGICAL MEDICINE.—*(With Special Knowledge of Mental Diseases)*: J. D. N. Hill, R. E. D. Markillie. *(With Special Knowledge of Mental Deficiency)*: M. S.-M. Rayner. *Part A:* J. de Bastarrechea, Helen Baker, R. Good, M. Radzan.

UNIVERSITY OF WALES

The following candidates have satisfied the examiners at the examination indicated:

DIPLOMA IN PUBLIC HEALTH.—*Part I:* Sonia D. Dymond, Gladys M. Herbert, Margaret H. Vickery, Llary M. Williams, Mary Williams.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

At a meeting of the Royal College of Physicians of London, held on April 25, with the President, Sir Robert Hutchison, in the chair, the Rt. Hon. Walter Elliot, M.B., F.R.S., Professor Edouard Rist, M.D., of Paris, Professor Alan Brown, M.B., of Toronto, and Dr. W. E. Gye, F.R.S., were elected Fellows under By-Law XXXIX(*b*).

The following Members were elected Fellows:

Sydney Fancourt McDonald, M.D.Melb. (Brisbane); Douglas Murray McWhae, M.D.Melb. (Perth); John Wycliffe Linnell, M.D.Camb. (London); Guy Austin Lendon, M.D.Adelaide (Adelaide); Cyril Carlyle Beatty, M.B.Lond. (London); Wilfrid Burton Wood, M.D.Camb. (London); Joseph Bamforth, M.D. Liverp. (London); Calvert Merton Gwillim, M.D.Lond (London); Herbert Victor Morlock, M.D.Lond. (London); Alexander Lyall, M.D.Aberd. (Aberdeen); Thottakat Bhaskara Menon, M.D.Madras (Madras); Shankar Sahai Bhatnagar, M.D.Lausanne, Major I.M.S. (Kasauli); William Brockbank M.D.Camb. (Manchester); Wilfrid Fletcher Gaisford, M.D.Lond. (Birmingham); Hugh Walker Gordon, B.Ch.Camb. (London); Samuel Levy Simpson, M.D.Camb. (London); Frederick Horace Smirk, M.D.Manch. (Dunedin); Geoffrey Sydney Todd, M.B.Sydney (Midhurst); Stanley Jack Hartfall, M.D.Leeds (Leeds); William Arklay Steel, M.D.St. Andrews (Hillingdon); John Richard Hugh Towers, M.D. Camb. (Leeds); Ernest Rohan Williams, M.D.Lond. (London); Thomas Benjamin Davie, M.D.Liverp. (Liverpool); Walter Montague Levitt, M.D., N.U.I. (London); Eric Gordon Oastler, M.B.Glasg. (Glasgow); Edward Weston Hurst, M.D.Birm. (Adelaide); Paul Hamilton Wood, M.B.Melb. (London); Frederick Murgatroyd, M.D.Liverp. (London); Kenneth James Franklin, M.D.Oxf. (Oxford); Thomas Shirley Hele, M.D.Camb. (Cambridge); Lionel Everard Napier (Calcutta); Leybourne Stanley Patrick Davidson M.D.Ed. (Edinburgh); Arthur Rupert Hallam, M.D.Ed. (Sheffield); and Harold Edward Whittingham, M.B.Glasg., Air Vice-Marshal R.A.F.M.S. (Wendover).

The President announced the appointment of Dr. N. B. Capon to be Milroy Lecturer for 1941, his subject being "The Principles underlying the Influence of Pre-natal and Neo-natal Health upon Later Life."

The following candidates, having satisfied the Censors' Board, were admitted Members:

Alexander Arthur Alderdice, M.B.Sydney, Charles Anderson, M.B.Lond., George Herbert Harry Benham, M.B.Manch., Austin William Byrne, M.B.Liverp., Charles Harry Catlin, M.D.Birm., Philip Richard Kendall Coe, M.B.Lond., Robert Cruickshank, M.D.Aberd., Mohamed Abdel-Halim El-Okbi, M.B.Cairo, William John Strachan Ewan, M.B.Aberd., Malcolm Weld Fletcher, M.B. Adelaide, Edward Brodie French, M.B.Camb., Anderson Garland, M.D.Lond., Nansi Eirlys Harry, M.B.Wales, Rupert Desmond Charles Johnstone, M.B.Lond., Denis Dalmain Keall, M.B.Camb., Lieutenant R.A.M.C., Franklyn Holt Lloyd, M.D.Florence, John Edward Lovelock, M.B.Oxf., George Edward Moloney, M.B.New Zealand, Samuel Oram, M.B.Lond., Ralph George Park, M.B.New Zealand, Robert Johnstone Porter, M.B.Camb., Leo Rau, M.D. Berlin, Charles Graham Riley, M.B.New Zealand, Allan Thomas Marsh Roberts, M.B.Lond., Mark Andrew Rugg-Gunn, L.R.C.P., Surgeon Lieutenant R.N., Herman David Ruskin, M.B.Witwatersrand, Georgy Petros Ghattas Sobhy Bey, M.D.Cairo, George Lees Taylor, M.D.Manch., Helen Margaret Taylor, M.B.Sydney, Peter Graham Todd, M.B.Lond., Hugh John Trenchard, M.B.Birm., Flying Officer R.A.F.M.S., Stephen Adrian Yaffe, M.D.Queen's Univ. Ontario.

Licences and Diplomas

Licences to practise physic were conferred upon the following 205 candidates (including 24 women) who had passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board, and have complied with the necessary by-laws:

D. J. Anderson, H. J. Anderson, M. Y. Ansari, G. A. S. Anthony, L. Babrow, D. W. Bain, A. M. Barnett, A. J. Barrett, A. J. Barwood, O. H. E. Bayles, L. B. G. Bennett, I. J. Bernstein,

Margaret R. Biggs, G. V. Blaine, A. R. Blowers, F. V. A. Bosc, B. F. Boyd-Cooper, T. R. M. Bristow, H. T. Calvert, J. C. K. Campbell, Joan E. Campkin, D. Caplan, M. Caplin, J. F. Cartwright, Isabella S. Chalmers, M. A. Charrett, Joan M. Cheale, R. Cocker, C. W. D. Cole, E. H. L. Cook, Dorothy J. Cooper, P. R. Cooper, D. Coueslant, J. P. Crawford, R. C. Cronin, G. H. Daglish, L. R. Dalton, R. W. Danziger, E. J. D'Arcy, J. I. Davies, Joyce G. Davies, R. R. Dickson, S. W. Dunkin, Mary E. Eiloart, J. A. Elliott, R. E. Ellis, Marguerite P. Elman, J. A. Evans, E. J. Ewell, Edith I. Fettes, R. D. Firth, F. M. H. Fletcher, I. G. Forbes, C. A. E. Forsander, T. L. Frank, Ll. M. Franklin, G. A. Fraser, S. S. Freedman, H. J. Friend, K. Froome, Aifolia Georgiadis, Charlotte F. Godrich, M. B. H. Golden, J. Gordon, T. W. Greatorex, J. Greene, E. Griffiths, C. W. Hall, Margaret E. Harker, R. W. Harries, J. H. Harrison, F. M. Hayes, W. H. N. Heavens, F. C. N. Holden, S. A. Holmested, J. A. G. Horton, Patricia K. Hosford, R. A. House, D. J. Howell, F. H. D. Hutter, G. H. Illingworth, C. W. H. Ingoldby, F. L. Ingram, P. V. Isaac, R. C. Jack, J. P. Jackson, J. Jacobs, J. A. C. James, E. W. Jarratt, W. H. W. Jayne, G. T. E. Jenkins, Margaret C. Jenkins, A. T. G. Johnston, E. W. Jones, G. G. Jones, A. Katz, J. Kaye, E. P. Kempsey, N. S. Kenchington, M. S. Khan, H. King, R. F. Kingston, Christine Kirby, N. D. Lance, J. J. Landon, S. E. Landy, M. Latner, T. S. Leedham, I. Levinson, E. Levy, A. Liberthson, D. G. Lloyd-Davies, A. G. G. Long, Mary E. Long, P. R. Lowns, W. T. C. Lumley, M. G. McColl, D. G. C. Macdonald, I. M. Macgregor, Kathleen B. McClintock, J. C. H. Maidment, D. H. Manson-Bahr, L. Marre, Winifred A. Mason, R. L. Meyers, C. Midwinter Jones, P. F. Milling, H. V. Morgan, R. W. M. Morrison, M. C. Mundle, J. M. Mungavin, B. Murphy, H. Nogler, F. G. Neild, A. R. Nettleton, Mary E. Nixon, D. M. Nundy, G. O'Gorman, B. H. O'Neill, E. I. Ostry, P. J. Pablot, R. Park, T. G. Paxon, A. G. E. Pearse, H. Petty, J. D. Philp, F. P. Powell, N. J. Pratt, B. H. Price, J. Price, M. Querido, Mary L. Rae, W. K. Rae, R. E. Rainey, H. H. Renyard, J. A. Rich, H. G. H. Richards, E. A. Ritchie, T. W. Robson, D. Romney, G. K. Rose, J. V. Rose, R. V. Rowan, B. C. Rowlands, M. H. M. Ryan, G. Savill, T. A. Shannon, R. E. Shaw, F. S. W. Shute, R. A. H. Simpson, C. C. Slack, B. J. D. Smith, G. S. C. Sowry, W. H. Spencer, A. H. Staples, B. A. D. Stocker, M. Strachan, R. P. Strang, G. Subba Rao, P. E. Sundt, P. H. Sutton, D. R. Syred, C. Thomas, Gwendolen M. G. Thomas, F. A. Thompson, W. Thompson, T. C. Thorne, D. A. Tolhurst, E. W. J. Townsend, M. Venugopalachari, Helen Wagstaff, J. J. Walker, A. I. Ward, M. B. Watson, G. O. C. D. Webb, J. M. W. Wells, May D. Westerman, J. C. White, J. R. D. Williams, I. H. T. Wilson, W. J.-S. Wilson, W. M. Winter, Nona E. Wright, P. S. Wright, H. Zinober.

Diplomas in Child Health were granted, jointly with the Royal College of Surgeons of England, to the twenty-one candidates whose names were printed in the *Journal* of April 20 (p. 676).

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Lectures on Applied Physiology

Lectures on applied physiology will be delivered in the theatre of the College (Lincoln's Inn Fields, W.C.) by Professor E. D. Adrian, F.R.S., on "The Nervous Mechanism of Pain" on Thursday, May 9, at 4 p.m., and Professor A. D. Macdonald on "Experimental Spinal Anaesthesia" on Thursday, May 16, at 4 p.m. The lectures will be open to medical practitioners and advanced students.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—T. A. H. Adkins, F. L. Dickson, F. W. Ford, E. Greenhalgh, P. Haden, G. T. Hammond, H. A. Kreiser, R. Morley, E. A. Roberts.

MEDICINE.—J. B. Brownlie, G. E. H. Enderby, H. A. Kreiser, R. Morley, S. J. P. Ras, J. P. Rochford.

FORENSIC MEDICINE.—J. B. Brownlie, G. E. H. Enderby, H. A. Kreiser, R. Morley S. J. P. Ras, J. P. Rochford.

MIDWIFERY.—J. B. Brownlie, J. B. Gurney Smith, S. G. L. Klein, R. Morley, F. A. Roberts, M. F. Smith, S. Wetherell.

The Diploma of the Society has been granted to T. A. H. Adkins, J. B. Brownlie, G. E. H. Enderby, F. W. Ford, J. B. Gurney Smith, P. Haden, H. A. Kreiser, R. Morley, S. J. P. Ras, J. P. Rochford, and M. F. Smith.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

At the quarterly meeting of the Council, held on April 27 in the College House, 58, Queen Anne Street, W., with the President, Professor W. Fletcher Shaw, in the chair, the following were formally admitted to the Fellowship:

D. F. Anderson, Glasgow, N. Attygalle, Ceylon, A. Barr, Glasgow, R. A. Brews, London, A. D. Campbell, Canada, J. Chakraverti, India, Gladys H. Dodds, London, R. L. Dodds, London, Edith M. Hall, London, C. D. Kennedy, Edinburgh, H. C. Lowry, Belfast, H. E. Murray, Calcutta, C. D. Read, London, J. W. G. H. Riddell, Plymouth, J. Sturrock, Edinburgh, Lydia I. H. Torrance, Calcutta, G. A. W. Wickramasuriya, Ceylon.

The following have been elected to the Fellowship:

S. L. Navaratnam, Ceylon, E. M. Robertson, Kingston, Ontario, M. Sarkar, Calcutta, Dagmar F. C. Wilson, Oxford.

The following were admitted to the Membership:

C. W. F. Burnett, Southend, J. A. Chalmers, R.A.F., A. Culiner, Canada, Grace J. Cuthbert, Sydney, S. Davidson, Birmingham, R. Eadie, Crieff, Alice B. Field, London, H. J. Green, Perth, H. A. Hamilton, London, D. R. Kilgour, London, O. Lloyd, London, H. S. McLelland, Brisbane, E. R. Rees, Harrow, H. M. Rees, Adelaide, Jane B. Roy, Dundee, C. S. Russell, Oxford, P. N. Simons, Sydney, G. R. Turner, Canada.

At the annual general meeting of the College, held on April 27 in the College House, with the President, Professor W. Fletcher Shaw, in the chair, the following were elected to Council in place of those retiring by statutory rotation. *Representatives of the Fellows:* Mr. Malcolm Donaldson, Professor John Chassar Moir, Professor Gilbert Innes Strachan. *Representatives of the Members:* Dr. Alexander William Spain, Dublin, Dr. John Marshall Scott, Exeter.

The meeting was followed by the William Blair-Bell Memorial Lecture delivered by Mr. Morris Datnow on "Blair-Bell—His Contributions to Science, with Especial References to Cancer Research."

Medical Notes in Parliament

Supplementary Rations

Mrs. ADAMSON asked Mr. Lennox-Boyd on April 24 whether he had received the Medical Research Council's advisory committee's report on food rations in regard to the requirements of invalids and expectant mothers on special diets for supplementary rations. Mr. LENNOX-BOYD answered that the advisory committee had considered the need of invalids and expectant mothers on special diets for supplementary rations, and expressed the opinion that under present conditions only in the case of persons suffering from diabetes mellitus was any variation required. In such cases additional meat coupons could be obtained on the surrender of sugar coupons.

Doctors and Military Service

Mr. SORENSEN asked on April 25 whether all medical practitioners called up for military service according to their age groups were given a commission, and whether those who declined a commission would be compelled to serve in a non-medical capacity in the ranks or would be allowed to continue medical work of a civil character. Mr. ERNEST BROWN said that no medical practitioner would be called up for military service without being offered a commission as a medical officer. He could not believe that medical practitioners called up in these circumstances would decline to accept a commission. If such a case should arise the man could not be allowed on that account to escape his liability for military service.

Discharge of an A.T.S. Patient.—On April 23 Lieutenant-Colonel MACNAMARA asked the Secretary of State for War whether he was aware that Mrs. Ruth Fullerton, who was in the Auxiliary Territorial Service, was discharged from the Auxiliary Territorial Service by a medical board on February 24, and, although very ill, was the following day discharged by ambulance to her home in Essex from the General Hospital, Leicester, and died on April 1 in Chelmsford Hospital. He was also asked whether he was satisfied that she was fit to leave Leicester Hospital when she did, and if it was the custom immediately to discharge from hospital members of the Auxiliary Territorial Service who had been boarded out of the Service irrespective of their state of health. Mr. OLIVER STANLEY said that Mrs. Fullerton was discharged from the Auxiliary Territorial Service on February 24, but was not moved from the civil hospital at Leicester till March 21. A patient discharged from the Service on medical grounds was not discharged from hospital if unfit to travel, but might be retained in hospital as a free patient until fit to travel. He was informed, however, that Mrs. Fullerton took her discharge from the hospital at Leicester at her own request and against the advice of the medical superintendent.

Medical News

The Benjamin Ward Richardson Lecture on "Centralized Slaughtering" will be delivered by Lieutenant-Colonel J. A. Dixon, chief veterinary officer, Leeds, at the Royal Sanitary Institute, 90, Buckingham Palace Road, S.W., on Tuesday, May 14, at 5 p.m.

The Ministry of Supply announces that in consequence of advances in the price of mercury since the previous order was issued the maximum prices of certain mercury compounds have been revised under the Control of Mercury (No. 4) Order, 1940, which came into force on April 19. Copies of the new Order may be purchased from H.M. Stationery Office, or through any bookseller.

The cost of treatment given at hospitals included in the Emergency Hospital Scheme to male or female members of the Services who are suffering from venereal disease is to be borne by the Ministry of Health in the same way as the cost of treatment of air raid casualties. The patients must, however, be referred by the appropriate Service medical authorities. The cost of examining specimens will be met in the same way.

A maternity home for the wives of junior officers and others is being established by the Board of Management of St. Mary's Hospitals, Manchester, in a large house in Victoria Park. There will be accommodation for twenty patients: ten in rooms having three or four beds, for an inclusive weekly charge of 5 guineas with a moderate guaranteed maximum however long the stay, and the remainder in single rooms at a slightly higher charge. The honorary medical staff of St. Mary's Hospitals are giving their services to the home. £9,000 is required for alterations and extensions, medical equipment, etc., and an appeal is being made for contributions towards this sum.

The annual general meeting of the National Association for the Prevention of Tuberculosis was held in Tavistock House, London, W.C., on April 18. The chair was taken by the Marchioness of Titchfield, who, moving the adoption of the annual report, referred to the part played at the beginning of the war by the Association, when a deputation waited on the Minister of Health. The views of the tuberculosis movement had been kept prominently before the authorities. The Christmas Seal Sale was a source of satisfaction and profit, not only to the Association, but to its affiliated care committees throughout the country. Formal business was followed by an address by Sir Hugh Walpole, who dealt with the effect of sickness on the character. The address was followed by a discussion on "Tuberculosis Care Work in Wartime," opened by Dr. J. B. McDougall.

The Church Army Sanatorium for tuberculous lads at Farnham has now been at work for twenty years, and during this period some 900 boys have been treated under the Marcus Paterson system. Of this number fully 90 per cent. have been discharged as "fit for anything." In the past ten months 330 ex-patients have been communicated with, and only five of this large number were found to be unwell from any cause. Some sixty are serving in the Navy and the Army, while others are to be found in the Police Force and in various industrial employment. It should be noted that only boys in the initial stages of tuberculosis are accepted for treatment at this sanatorium.

The Women Public Health Officers' Association has recently published at the price of 1s. an attractively illustrated booklet entitled *Public Health and Social Welfare in Canada and the United States of America*. This is a report of an educational tour made by thirty-eight members of this association in Canada and the United States. It can be obtained on application to the Honorary Secretary, 33, Campden Hill Road, Kensington, W.8.

An out-patient department for plastic surgery has recently been established in Rome under the direction of Professor A. Manna.

The notifications of cerebrospinal fever for England and Wales for the week ending April 20 were 390.

Under the title of *Tuberculosis* the Committee on Medical Research of the National Tuberculosis Association of the U.S.A. has prepared a bibliography of published work supported and stimulated by that association. It is published by the U.S. Public Health Service.

The April issue of the *Journal of the Royal Army Medical Corps* contains the proceedings of the inaugural meeting of the British Medical Society of the Dieppe area, held at Dieppe on March 10 under the presidency of Major-General Priest, K.H.P., Consulting Physician to the B.E.F.

With its February issue the *Journal of Contraception* changed its name to *Human Fertility*, and will continue to be issued under the auspices of the Medical Department of the Birth Control Federation of America.

The King has granted to Sir StClair Thomson permission to accept and wear the Insignia of Commendatore of the Order of the Crown of Italy, conferred upon him by the King of Italy and Albania.

The King has appointed Dr. Percy Selwyn Selwyn-Clark, *M.C.*, to be a Member of the Executive Council of the Colony of Hong Kong.

Dr. Etienne Burnet, director of the Pasteur Institute of Tunis, has been made a Commander of the Legion of Honour.

According to a recent report issued by the Narcotic Division of the Department of Public Health, the number of drug addicts in Canada is 4,000, as compared with 8,000 ten years ago.

The number of births in France, which was 1,022,000 in 1876, fell to 750,000 in 1930 and 616,000 in 1939. During the last three years the number of deaths has exceeded the number of births by 14,000 on the average annually.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

There was an appreciable fall in the incidence of most of the principal notifiable diseases in England and Wales during the week, with the exception of scarlet fever and whooping-cough.

We may draw attention here to the decline in the notifications of diphtheria in South Shields. During each of the years 1938 and 1939 there were between 500 and 600 cases with a case fatality of over 10 per cent., but 1940 has seen a marked improvement: during the last two months 5 was the highest number notified in one week. In the week under review 2 cases were notified, and reports just to hand state that the following week South Shields was free from diphtheria for the first time in two years. While most of the credit for the disappearance of the disease will naturally be given to the intensive immunization campaign which has been carried out by the local sanitary authority, in the course of which 14,000, or 60 per cent., of the children of the town have been immunized, some allowance must be made for the effect of herd immunization from the prolonged "salting" to which the susceptible population has been subjected with such serious results, and to seasonal influences which have largely accounted for the general fall in the whole country.

In Scotland there were 2 cases of typhoid fever (in Glasgow) and 26 cases of paratyphoid fever; of these 17 were in Glasgow, 2 in Paisley (in Renfrew), and 1 each in the counties of Dumfries, Fife, Lanark, Midlothian, and in the burghs of Airdrie and Coatbridge (both in Lanarkshire) and in Greenock (Renfrewshire). There was 1 death in Paisley.

Of the 142 cases of measles notified in Northern Ireland during the week all but 1 were in Belfast, in which there were 5 deaths. In this city there have been in the immediately preceding four weeks 228, 179, 202, and 217 cases of measles, and 11, 3, 3, and 6 deaths from this disease.

No. 15

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended April 13, 1940.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1940					1939 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	411	29	84	3	5	34	1	16	3	1
Deaths		6	5				2	—		
Diphtheria	693	29	229	41	39	845	98	165	43	14
Deaths	25	—	8	—	2	20	1	5	2	1
Dysentery	51	7	45		—	18	8	18		1
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	4	1	1	—	—	3	—	—	1	—
Deaths		1	—				1	—		
Enteric (typhoid and paratyphoid) fever	21	1	28	6	3	11	2	11	12	—
Deaths	—	—	1	—	—	1	—	—	—	—
Erysipelas			60	6	5			70	6	7
Deaths		—	—				1	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	26	4	5	6	7	63	9	5	4	8
Measles*	3,592	45	104		142		43	90		3
Deaths	3	—	—	—	5	9	—	1	4	—
Ophthalmia neonatorum	84	5	21		—	86	6	27		1
Deaths										
Pneumonia, influenzal†	873	72	9	4	12	1,304	119	9	2	10
Deaths (from influenza)	72	10	5	7	1	127	18	7	—	1
Pneumonia, primary			208	11				227	15	
Deaths‡		55		16	12		19		16	8
Polio-encephalitis, acute	2	—				1	—			
Deaths		—					—			
Poliomyelitis, acute	4	—	1		1	3	—	1		—
Deaths		—	—				—	—		
Puerperal fever	2	2	8	2	—	—	—	10	2	—
Deaths		—					—			
Puerperal pyrexia	165	13	32		1	231	18	22		2
Deaths										
Relapsing fever	1	—			—	—	—			—
Deaths										
Scarlet fever	846	40	117	51	78	1,700	151	248	49	56
Deaths	1	—	1	—	—	2	1	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough*	603	6	45		15		402	190		19
Deaths	7	—	2	5	—	21	3	4	—	1
Deaths (0-1 year)	389	47	65	30	39	403	61	75	26	23
Infant mortality rate (per 1,000 live births)						63	52			
Deaths (excluding stillbirths)	5,252	854	706	217	178	5,559	1,020	707	207	159
Annual death rate (per 1,000 persons living)			13.0	14.5	15.6	13.7	13.0	14.3	13.9	14.0
Live births	6,693	1,011	934	358	230	6,132	1,037	1,055	276	212
Annual rate (per 1,000 persons living)			18.9	23.9	20.2	15.1	13.2	21.4	18.6	18.6
Stillbirths	272	33	42			235	35	37		
Rate per 1,000 total births (including stillborn)			43			37	33	34		

* Made notifiable generally on November 1, 1939.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Since January 1, 1940, figures for London (b) have been for deaths from all forms of pneumonia; the corresponding figures for 1939 relate to deaths from lobar pneumonia only.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Informing the Young

Dr. L. B. (Hull) writes: I shall be pleased to learn of a small book which will be useful as a guide to the parents of a young child who want to know when and how it is best to inform the child, a girl, concerning questions of sex, including the birth of children.

Tests of Binocular Vision

A correspondent writes: Some of us who are doing work at Recruiting Medical Boards have had difficulty in understanding an order asking for men to be marked as having "monocular" or "binocular" vision. Advice would be appreciated.

*** Mr. Bishop Harman, to whom we have submitted this inquiry, writes: Eyes may be very odd, and the vision unequal, and yet there may be binocular fixation and binocular vision of a sort. When the state of each eye is determined by appropriate examination, and the best vision with correcting glasses ascertained, then tests for muscle balance and binocular vision should be carried out. In distant vision the simplest of these is the red-green spectacle test. Spectacles with a red right glass and a green left glass are put on the face of the patient over the correcting glasses. He is then shown a bright little bullseye light at the distance of six metres. If he sees the two colours, either fused or separated, then he has some sort of binocular vision. The displacement of the two colours may be measured and possibly corrected by prisms. Finer tests of the same sort may be taken with Maddox rod. In near vision tests may be made with Harman's diaphragm test or Maddox wing test. All these tests are easily applied to persons of ordinary intelligence; even children respond to them well.

Cramp in Legs

"M.B." writes: With regard to the query by "Corvus," cramp in the legs is, I believe, very frequently caused by the formation of toxic substances in the intestines. I have suffered from similar trouble for several years past, and always find that a few doses of calcium lactate stop this very distressing symptom. It is a simple remedy, but I think worth trying.

Dr. ALEXANDER FRANCIS (London, W.) writes: A simple way of almost instantly stopping cramp in the legs is to pinch hard on a spot at the back of the leg, just above the ankle, with the finger and thumb placed in front of the tendo Achillis.

Dr. F. B. FEAST (Birmingham) writes: "10 or 15 grains of phenazonum one hour before bedtime effectually prevents attacks of cramp.—*B.M.J.*, 1912, **2**, 1428." This is quoted in Squire's *Companion to the British Pharmacopoeia*, second edition, 1915, p. 615. I have given it in many cases and always with success.

The Secret of the Chamberlens

"G. C. B.," who has been reading a book, *Secret Hiding Places*, published in 1934, came across a reference to the discovery of midwifery forceps and other objects in a secret closet at Woodham Mortimer Hall, near Maldon, in Essex, formerly occupied by Dr. Peter Chamberlen, the third of that name, who was born in 1601 and died there in 1683. Our correspondent asks for authoritative references to this discovery, and to the Chamberlens and their obstetric instruments.

*** A summarized account of the matter will be found in Dr. Herbert Spencer's *History of British Midwifery* (the Fitz-Patrick Lectures for 1927). In an introduction headed "The Chamberlens and the Midwifery Forceps" Dr. Spencer acknowledges his debt to the admirable and fascinating work of the late Dr. Aveling, adding: "As inventors of the obstetric forceps—the most beneficent of surgical instruments—the name of the Chamberlens is immortal, though its lustre is tarnished by the secrecy which they maintained in regard to the nature of their invention and by the boasting and self-seeking of the most conspicuous members." *The Chamberlens and the Midwifery Forceps*, by J. H. Aveling, M.D., F.S.A., was published by J. and A. Churchill in 1882, and the woodcuts include a view of Woodham Mortimer Hall, several portraits, and drawings of the forceps found there in 1813. Aveling concludes, after thoroughly sifting the matter: "As far, therefore, as can be determined by existing evidence Peter Chamberlen, senior, may with almost absolute certainty have the honour conferred upon him of being the inventor of midwifery forceps." William Chamberlen, who came to Southampton as a Huguenot refugee from France in 1569, died some time before 1596, leaving two sons both bearing the name "Peter"; of these Peter the elder (Peter Chamberlen senior) died in 1631. Peter Chamberlen III, usually known as "Dr. Peter Chamberlen," was the eldest son of Peter Chamberlen the younger. He died on December 22, 1683, at Woodham Mortimer Hall, where the obstetrical forceps and other instruments were discovered 130 years later in a secret space hidden by a trapdoor on the second floor above the porch. The instruments were taken possession of by Mr. H. H. Carwardine (a friend of the owners of the estate), then a practising surgeon. He brought them to London and presented some of them to the Medical and Chirurgical Society in 1818. They are preserved in the library of the Royal Society of Medicine. A brief account of their discovery was published by Carwardine (his name is there misspelt Cansardine) in the *Medico-Chirurgical Transactions*, 1818, volume **9** (p. 181). The Royal Society of Medicine possesses a water-colour drawing of Woodham Mortimer Hall.

Book for Ship Surgeon

"J. A. K." (Bournemouth) writes: Can you recommend a book suitable for the use of a ship surgeon?

Income Tax

Repayment of Loans

"D. M." inquires: If I buy a practice and borrow, say, £3,000, repaying £500 a year, do I pay income tax on the interest and/or on the annual £500?

*** Tax is, of course, payable on the profits of the practice, and the question is whether either interest or repayment is deductible in calculating taxable profit. Neither is deductible; "interest" because "D. M." is entitled to recoup himself by deducting income tax from the interest as he pays it, and "repayment" because that is a capital transaction representing an investment of savings.

LETTERS, NOTES, ETC.

Napkin Rash

MRS. MARY GRAHAM ELWELL, S.R.N., writes: Replying to Dr. Mary Fisher's letter in your issue of April 20 (p. 672), may I offer the following practical suggestions for the prevention of ammonia dermatitis, based on direct experience as a nurse and mother. Disinfectants in the final rinsing are unnecessary if all soap is diligently removed by several rinsings in clean water. The napkins should be *boiled* daily, and dried out of doors whenever possible. The application of a paste consisting of equal parts of zinc oxide and castor oil produces a "waterproof" skin, which remains impervious to urine for a reasonable period. The slight massage involved improves local circulatory conditions and produces better skin resistance. Changing of wet napkins as soon as conveniently possible is most important. I consider the widespread use of rubber protectives an important contributive factor in the production of unhealthy napkin areas. These rubber knickers merely give the mother a sense of false security and increase the time between "changes"; cf. the heat and moisture retention when oiled silk covers a fomentation. I would add a note on the correct and adequate application of the diapers (two ought to be used) in order to ensure efficient "mopping." After folding the napkin into a triangular shape the two ends (at the base of the triangle), which one usually finds folded over each other on the abdomen, should be carried down between the legs and the third corner pulled up to cover them, thus securing *six* layers from each napkin, where, as a rule, only two are available.

Short-wave Diathermy for Throat Infections

Dr. MARY G. H. EDWARDS writes: I have made use of treatment by short-wave diathermy with great success during the recent epidemic of pharyngitis and tracheitis. In every case the second treatment was followed by very marked relief, all pain on coughing having disappeared, and the constant reiteration of the cough greatly diminished. One of my patients felt relief during the first treatment, and in no case were more than four treatments of half an hour's duration necessary. The application is very simple, no unpleasant wet pads are necessary, and the patient has no need to be stripped. The electrode is placed over the clothing, so, providing the apparatus is portable, no patient is too ill to receive treatment. Compared with cases treated by medical methods during the first part of the epidemic, the time limit for the cure was reduced from a period of at least two weeks to about four days. No case was found resistant. I found the treatment also beneficial in cases of otitis media, sinusitis, and pleurisy. The apparatus is, of course, costly, an efficient portable costing £65, but most massage establishments have an apparatus which is inclined to stand idle because the medical profession does not bear this treatment in mind, or, perhaps, does not realize what it can do.

Verminous Evacuees

Dr. M. E. LAMPARD (Colchester) writes: I am sure that many of the provincial practitioners who have been attending evacuated London school children will be extremely surprised to find that only 2.3 per cent. of them had vermin in their hair. We were told that the reason that so many of the children who came here from London were verminous was that the school term had not started, and the L.C.C. nurses had had no chance to clean them. It seems almost incredible, from reports from doctors in the neighbourhood and from conversations I have had with doctors in Sussex, that only 2.3 per cent. of the children are verminous. A doctor friend of mine doing research had six children in his house, and the hair of all of them was infested. The only other two evacuated children in his lane were also infested. He said that it seems hard to believe that 349 children living near by had clean heads! I wonder if the counting of the children is done at the beginning or at the end of the term, and whether it includes just those children who become reinfested immediately they go home, and whom, therefore, the nurses cannot clean, or whether it includes all children before they are treated for it.

Standardization of Shiga Antitoxin

Dr. C. RUSSELL AMIES writes: In your report of a discussion on dysentery at the Royal Society of Tropical Medicine (April 27, p. 706) you attribute to me the statement that "the international unit was attempted in 1927." My actual statement was that the unit was *adopted* in that year. The word *attempted* gives an entirely erroneous impression, implying that the standardization of *Bact. dysenteriae* (Shiga) antitoxin was not agreed upon, whereas, in fact, most European serum institutes did adopt the international unit, and this has been an important advance. In view of the importance of making the position clear I would suggest that your error should be corrected. Dysentery will certainly become a big problem among troops in the Near East this summer, and it is of the utmost importance that medical practitioners should understand that the potency of Shiga antitoxin, like diphtheria and tetanus antitoxin, is now controlled by the Therapeutic Substances Act.

We are asked to point out that in the annotation in the *Journal* of March 30, on desoxycorticosterone, the abbreviation D.O.C.A. in the third line is not a recognized scientific abbreviation but a trade mark for the synthetic adrenal cortical hormone employed by a firm of manufacturing chemists.